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ABSTRACT

This report reveals the size and scope of the efforts of the Council on Library Resources (CLR) to meet current and emerging social needs for library-based information service. The current definition of library resources is given, and current challenges are identified. A complete description, to date, of the National Engineering Information Initiative (NEII), a project to develop an online virtual library for engineers, is given in the first section. Through its infrastructure program, the Council continues communication and cooperation among the various information systems that support libraries, as discussed in the second section. Infrastructure topics include current information projects, policy, planning, collaboration, scholarly communication, Network Advisory Committee, and community networking. The third section deals with human resources topics such as leadership and development, library and information science education, and research and reports. Final sections discuss economic as well as access and processing issues. A bibliography listing 63 publications and reports resulting from CLR programs in 1993/94 is provided. The report concludes with financial statements of current active projects. (MAS)

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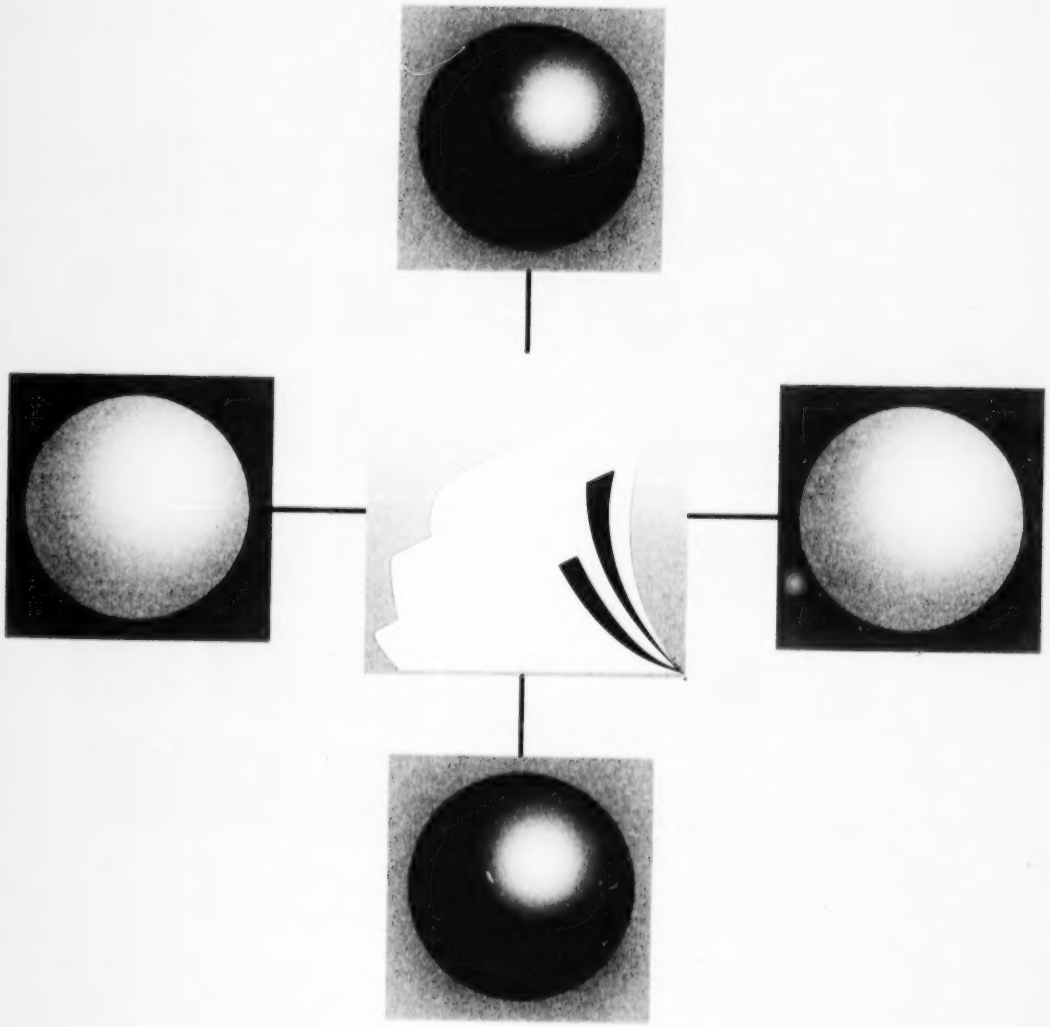

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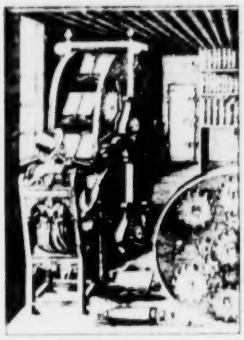

The scholar at his book-wheel is a reproduction of an engraving in Agostino Ramelli's *Le diverse et artificiose machine...* (Paris, 1588). It first appeared in the Council's third annual report, with the following explanation: "the picture symbolizes the interest of the Council on Library Resources in both the content of books and the mechanics of library service." The engraving has appeared in each annual report since that time.

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Council on Library Resources
1400 16th Street, N.W., Suite 510
Washington, D.C. 20036-2217
Telephone (202) 483-7474
Fax (202) 483-6410
Internet clr@cni.org

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4. Deceased, May 14, 1994.
5. Deceased, March 19, 1994.

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CHAIRMAN'S MESSAGE

Many of our nation's industries and educational and research institutions have undergone organizational change as a result of unprecedented economic, technological, and political challenges. The Council on Library Resources has recognized that the rapid changes in these institutions affect the social environment in which individuals seek information. This report reveals the size and scope of the Council's efforts to meet current and emerging societal needs for library-based information services.

During the past two years, the Board of Directors has re-examined the program activities of the Council on Library Resources in relation to the declining availability of funds for seeking solutions to library problems. While the Board continues to endorse the general areas of interest in infrastructure, human resources, library economics, and access/processing, it has suggested that the Council establish priorities for program expenditures within the current framework of financial realities.

In this context, the Board believes that the Council's human resources program can aid in the development of leaders who will build and manage the information systems needed to serve the educational, research, and service needs of their communities. With generous support from the W.K. Kellogg Foundation, the Council will explore how best to prepare current and future leaders for a changing and increasingly technological society. Through meetings, informal networking, and project investigations, we will learn from today's innovators what works and what is needed to increase the capacity of those in the library and information science profession to articulate their role and function within their respective communities.

The need for economic data that are useful for improved library planning, operations, and services remains a high-priority element of CLR activities. For the past three years, the William and Flora Hewlett Foundation has provided funding for the Council to support studies to begin to address the questions of how best to allocate the limited resources available to libraries.

We have noted the strong interest of the Andrew W. Mellon Foundation, a major supporter of the Council, to seek new methods of reducing institutional costs related to the process of scholarly communication. The Council hopes to extend its previous interest in the economics of library and information services in order to help libraries and the higher education community better understand the nature of rising costs of library materials and operations, especially the high costs of interlibrary loans.

We are confident that despite the changes occurring in our society today, the Council on Library Resources will continue to identify major problems affecting libraries and to provide appropriate human and financial resources that will lead to innovative improvements in the flow of information and the transfer of knowledge.

Martin M. Cummings

Acting Chairman

PRESIDENT'S MESSAGE

As the Council approaches the end of its fourth decade of operation, it is appropriate that we examine our role as well as our activities. In last year's annual report we included a special insert on the Council's past as well as its current activities and the environment in which it now operates. This year's special feature highlights our initiative to create a National Engineering Information System. This effort encompasses a variety of roles for the Council and, I believe, is exemplary of the multiple roles the Council can play in future decades.

The Council serves in six major roles:

- *Catalyst* Seed money or a letter of endorsement can be all that's necessary to get a good idea off the ground. Many significant library programs today began as small projects initially identified and supported by the Council.
- *Convener* With no vested interest save that of improving library services, the Council can bring together disparate groups of individuals and organizations to address common concerns.
- *Collaborator* Working with other organizations, the Council can bring about significant change. The Council emphasizes cooperative approaches to solving problems and enhancing resources.
- *Facilitator* The Council can focus discussion and encourage projects to expedite operations.
- *Funder* The Council has never had enough money to fund every library's projects, but it does and can support individual projects to resolve problems faced by them all. Council funds have often been used to leverage other institutional resources.
- *Manager* When needed, the Council manages large-scale projects by providing the right mix of administrative and technical expertise.

The Council has, by its very name and nature, always been concerned with all forms of library resources, including people, collections, space/buildings, and systems/networks. As in the case of the engineering initiative, the Council will strive to shape a foundation for the future through the development, sharing, and innovative use of these resources.

W David Penniman

OVERVIEW

In the spring of 1955, a group of individuals interested in the problems of American libraries developed a proposal to establish a Library Commission. The proposal was submitted to the Ford Foundation, which responded by providing an initiating grant for support of the recently incorporated Council on Library Resources. The name chosen for the Council was important because it indicated that the Council was to be more than a commission for libraries themselves; its purpose was to address library resources generally. The Council's founders considered its role to be more than just a provider of financial resources. In addition, it had a responsibility to help libraries to develop and improve their own resources and services.

Almost four decades later, the Council "on Library Resources" continues to look at library resources in the broadest possible context. As the nature and type of library resources have changed over the years, so have the activities of the Council. What follows is a snapshot of the Council's current thinking on this topic.

Library Resources

While resources can be narrowly defined as either capital assets or wealth, there are many ways to characterize library resources. For the purposes of this annual report, the Council considers the following to be the current types of library resources:[1]

1. Materials in various forms and formats, used to respond to present and future demands (e.g., collections of resources).

2. People trained to provide access to information (e.g., librarians and information specialists, or human resources).

3. People who develop the systems and processes to organize, deliver, or manipulate information.

4. Buildings and spaces that provide areas for work and collaboration for both the communities served by libraries and the individuals who staff them.

5. Networks or systems that are developed to improve access to and delivery of information (e.g., infrastructure).

6. Budgets or funds directed to the operations of an organization or to specific projects or services (e.g., financial or economic resources).

The Council considers "library" to be an encompassing term. It includes any institution concerned with management, stewardship, and support of the delivery of information resources in whatever form at whatever place and time. Increasing economic and technological challenges compel the leaders and staff of those institutions to take a new look at how they can efficiently manage the resources available to them, no matter how extensive or limited those resources may be.

Current Challenges

The environmental overview for libraries and society was addressed in our 1993 annual report. This year we take a look at some of the changes occurring to library resources:

- Changing nature of materials

While most library collections are still print-based, an increasing number of materials are available in electronic form. The challenge for libraries lies in how to manage the continued growth of the current, largely print-based collections, while looking for the means to develop new processes and services to handle the expanding digital ones.

- Globalization of information services

Information has become an international commodity, and libraries are no longer the only organizations delivering information services. New businesses and services have emerged to challenge the roles formerly performed by libraries.

- Increased use of contracted services

Libraries have always looked for efficiencies in operations, and contracted services are not a new phenomenon. What is new is the extent to which the combination of financial exigency and technology has created new opportunities for out-sourcing library services. If necessary technical skills can be purchased, the role of library staff

1. For an expanded discussion of this topic, see W. David Penniman, "Tomorrow's Library," *Computer Methods and Programs in Biomedicine* 44 [in press].

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and management changes from one of a focus on the work to one of oversight and contract management.

- Self-sufficient and demanding users

Today's library users often come with technical skills and a desire to "do it myself." The pervasiveness of technology in society and the promises made by commercial producers have also contributed to the notion of easy and convenient access to information, which is creating demand for new and expanded library services.

- Changing workforce

The changing demographic makeup of our society, along with societal trends toward new family structures and lifestyles, will affect the recruitment and retention of library staffs. Concomitant with the trends in industry, library organizational structures are also flattening, and individual workers are being given both more authority and more responsibility.

- Changing information delivery systems

As information becomes increasingly electronic, new forms of information delivery become available. The variety of options challenge libraries' traditional means of information delivery.

- Increasing number of networks

Organizations often recognize that in constrained financial times, collaborative projects and programs have many potential benefits. However, the complexity of participating in and managing multiple relationships is a challenge some libraries have already appreciated and others will need to acknowledge as additional coalitions or networks develop in the future.

- Systems replacing buildings

The promise of a digital world suggests to some that new buildings for the storage of materials may no longer be needed. Others, however, recognize that outdated facilities will need to be redesigned for electronic information delivery. Capital improvement planning is particularly challenging when old and new information formats meet in library facilities.

- Space for workgroups

Although buildings may seem less necessary in an electronic environment, the increased use of networks and desire for collaborative working relationships still requires space for individuals to meet and work. This is a different kind of space than has been traditionally provided by libraries, for the public areas as well as staff rooms.

- Decreased availability of funds coupled with an increased demand for accountability

Underlying many of the challenges facing libraries today is a recognition of the limited funds available for them to fulfil' what have been their traditional functions. Parent organizations are requesting more detailed statistical and economic analyses to justify expenditures.

Role of the Council

Although library resources can be characterized in a variety of ways and the challenges facing libraries are many, the Council has chosen to direct its energies to four areas of library resources: the human resources, the economic resources, the community resources (i.e., infrastructure), and the resources of services (access and processing). Our distinctive challenge is to provide support to the library community in general to address the changing nature of those resources in broad, but useful, terms.

* * *

The following program review describes both completed projects and those that have been initiated during this year. The first section provides an expanded description of the National Engineering Information Initiative (NEII), which has occupied much of the Council's time and resources during the past year and in previous years. The goal of this initiative is to establish a coordinated system to improve access to the information resources needed by our nation's engineers.

Reports on research funded in previous years are also included in the program review. These reports provide a look at how we are using our resources to address library issues. Full citations to the works referenced appear in the bibliography, beginning on page 43; current projects are listed in the section beginning on page 48, Grants and Contracts Active in Fiscal 1994.

THE COUNCIL ON LIBRARY RESOURCES AND THE NATIONAL ENGINEERING INFORMATION INITIATIVE

A college engineering class is hardly the first place you'd think to turn for entertainment. But walk into the engineering department of any college or university in the country, and lying somewhere about you're likely to find one of the most riveting pieces of film ever made.

It is a newsreel of the collapse of the Tacoma Narrows Bridge in 1940, and on pretty much every college campus that has a copy, it has long been something of an underground classic. There are devotees of Shakespeare or Russian history whose only academic exposure to engineering came when an excited friend dragged them over to check out the enormous span of the bridge as it bucks and twists in the wind. Whatever one's training, it is almost impossible to walk away from the film without a healthy regard for nature's displeasure with mistakes.

It is also, for those who care to delve a little deeper, hard to walk away without thinking about the price engineers pay for treating information cavalierly. The Tacoma Narrows was not the first bridge to collapse under the pressure of the wind. There had been similar cases documented as far back as 1826 in England, Scotland, Wales, and Wheeling, West Virginia. Other suspension bridges built shortly before the Tacoma Narrows—including the Golden Gate—had shown complex oscillations in the wind. Whether the engineers who designed the Tacoma bridge looked into those cases no one knows, but it is hard to believe that if they had—and had paid attention to the lessons to be drawn from those earlier incidents—the Tacoma disaster would have taken place.

"The Tacoma Narrows Bridge took slenderness beyond any reasonable limits of experience," concluded Henry Petroski in his 1985 study of the role failure plays in design, *To Engineer is Human*. "If the designers of the bridge had known the story of the Wheeling Suspension Bridge...they would have had no excuse for overlooking the wind as a possible cause of failure."

With or without an excuse, the designers of the bridge do provide a dramatic lesson in the importance of information to the practice of engineering. Like medicine, like chemistry, even like farming, successful engineering builds on the steady accretion of knowledge and on the ability of its practitioners to find the particular nuggets of information that shed light on their problems. The cost of failing to find them, failing to look for them, or simply ignoring them can be anything from a simple waste of time and money to outright catastrophe.

Physicians, chemists, and those interested in agriculture, though, all have a leg up on engineers when it comes to looking up information: they can do it easily. A doctor confronted by a rare tropical disease can turn to the National Library of Medicine's computer-based information service, which includes the MEDLINE® database of journal article references. A chemist trying to keep up with the latest petrochemical research has the American Chemical Society's Chemical Abstracts Service at his or her disposal. An agricultural researcher developing new rice strains or an extension agent helping farmers explore sustainable practices can rely on the National Agricultural Library and the citations available on the AGRICOLA database.

Engineers, too, have an extensive set of resources to call on. They have their company's library or technical information center. They have the journals and publications put out by the various engineering societies. They have not-for-profit and for-profit information services, and countless databases available either online or by CD-ROM. They have shelves full of handbooks and traditional reference sources, with new works being published every year. They have state and municipal codes and books of regulations, marketing studies, reports on new production processes, and streams of technical studies coming out every month.

What they don't have is a way to sort through it all, or to find what they're looking for without a great deal of legwork. They don't even have an easy way to find out which items in all that material can actually help them with their particular problems. They don't, in other words, have a library.

That is a void that the Council on Library Resources has been investing its energy and resources to see filled. In the

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same spirit that led the Council over three decades ago to help the National Library of Medicine automate its main bibliographic service—a project that ultimately grew to become MEDLARS, the NLM's computer-based information service—it has spent the last four years trying to spur the birth of a virtual library for engineers, an online resource that would allow anyone with a need for information related to a technical problem to sit down at a terminal and find it.

The National Engineering Information Initiative (NEII) has not been a particularly easy project to promote. The initial conference to explore the idea was held over two years ago; its participants left filled with enthusiasm and spurred by a sense of mission. Since then, though there has been progress on several fronts, the momentum built by the conference has dissipated as participants have found themselves enmeshed in other projects, and the Council's search for money to pay for a full-time organizing effort has come to naught.

Yet the notion continues to intrigue and compel those who hear of it. Its appeal to information specialists is obvious, quite apart from the challenge of building a library whose holdings would exist in many places at once; engineers form a community that is not well served by the fractured and unorganized state of their information resources. For researchers, students, and those engineers who routinely rely on published information, a single window into the panoply of material available would be a godsend. And for those practicing engineers who think about where their work is headed, finding a way to make the search for information and data more efficient has profound implications for such cutting-edge issues as competitiveness and the mushrooming information needs faced by the profession.

Indeed, the Council's own setbacks in securing funding to push the NEII forward come against a backdrop of growing national interest in finding ways to make technical information more readily accessible. The increasing use of online services and of the Internet has brought new attention to the frustrating disorganization of the material available online—"the digital equivalent of a used book store," is how *Science* magazine recently described the Internet. In fact, in October 1994, the National Science Foundation (NSF) announced grants to six university-led consortia to develop systems for collecting, storing, and organizing digital technical information. It was an agenda-setting move that sets the problem squarely among the nation's research priorities.

Those individual projects, as well as others under way both here and abroad, will undoubtedly form some of the building blocks needed to create order out of the anarchy that now bedevils the nation's technical resources. It is not at all certain, however, that they will actually wind up doing so without a concentrated effort to weave them into a coherent whole. That is why the Council put so much time and money into the effort to build an NEII. When faced with flux and disorder, it has been the Council's historic role to lend a guiding hand on behalf of simplifying and expanding access to information; the circumstances facing technical researchers and practitioners called for just such an undertaking.

The NEII is not, actually, the first effort to create a national information service for engineers. In the late 1960s, building on studies of ways to improve access to engineering information that had been initiated by the various engineering societies earlier in the decade, a joint committee of the United Engineering Trustees, the Engineering Index, and the Engineers Joint Council came down strongly in favor of creating a "United Engineering Information Service."

The Battelle Columbus Laboratories, commissioned to explore how such a service might be built and what functions it might perform, eventually recommended creating a new not-for-profit corporation to handle the information needs of engineers and scientists. It would refer them to sources of information—whether institutions, articles, or people—as well as publish technical reviews, study information handling, and try to coordinate research and development efforts in the field of disseminating technical information. The proposal got a warm reception in enough corners of the engineering and technical communities to encourage the engineering societies' joint committee to set about trying to put it into action.

Even so, the proposal was, for all intents and purposes, stillborn. A new corporation, no matter how well-intentioned, would inevitably compete with existing information providers. So while some engineers enthusiastically backed the idea, the various engineering soci-

eties, as well as a number of other engineering information providers, saw the proposed service as a distinct threat to their own activities. Their combined opposition was enough to kill it.

The need for some integrated means of handling engineering information, however, never disappeared; if anything, it grew more pressing. And so in June 1992 the Council on Library Resources and the Engineering Foundation sponsored a week-long conference in Palm Coast, Florida, to explore ways of creating a national engineering information service and to come up with a plan for bringing it into being.

The Council's involvement was hardly surprising. Convinced that advances in information technology had opened new possibilities for a national system, the Engineering Foundation had begun planning the conference in 1990; it enlisted W. David Penniman, who was director of information services at AT&T Bell Laboratories at the time and had been one of the principal researchers on Battelle's united engineering system study. The following year, Dr. Penniman became president of the Council. "What has sustained my passion for the idea [of a national engineering information system]," he told the conference on its opening morning, "is the firm belief that engineers in the U.S. need better information support, and that such support would more than pay for itself in increased productivity." The country's information infrastructure, especially the so-called "information highway," is rapidly taking shape, Dr. Penniman said, "but we must be as concerned with content as with channels." A national information system for engineers would be a large step in that direction, exploiting the emerging online infrastructure to carry information that engineers use or could be using if it were more accessible.

In retrospect, it is rather remarkable that the conference produced a fairly coherent view of the shape that a National Engineering Information Service—or NENGIS, as it was then being called—might take. The first few days were somewhat chaotic, as participants listened to speakers outline existing resources, lay out the issues to be addressed, and disagree on whether any action on building a national system was in fact needed. In between the presentations, there was heated debate among the ninety participants themselves—most of them information specialists, although many with ties to engineering in academe, government, or the corporate world—as to the importance of a national system and what it should look like.

Yet over the five days and nights of the conference, participants converged on a strikingly cohesive set of conclusions. The demand for increased efficiency, quality, and productivity on the part of engineers of all types, they agreed, could only be met by improving access to information. Doing that would require an integrated system available to engineers wherever they work that would give them access to the entire range of material they need, from written codes and standards to online manufacturers' catalogs to basic principles, CAD-CAM designs, software, leading-edge research, marketing data, and the multitude of other pieces of information engineers use in their jobs. And building that system meant pushing forward on several tracks:

- studying the ways engineers find and use information;
- establishing an oversight panel that could push the notion of a major national initiative and coordinate the efforts to create it;
- linking people who were already experimenting with ways of improving access to scientific and technical information;
- building a constituency for the system by making it clear that it was meant to expand access to existing sources of information, not to supplant them;
- enlisting the various stakeholders in a national system—from current information providers to eventual users—in its design and implementation; and
- finding ways to improve engineers' awareness of and ability to use information sources, preferably as part of their basic curriculum in school.

In many ways, the conference was a watershed. It produced the first clear articulation of the promise an electronic engineering information system might hold for the country. It laid out the complex array of steps needed to build such a system. And, perhaps most importantly, it brought to the attention of the ninety participants (and, by extension, their colleagues) the importance of thinking creatively about the delivery of technical information.

That last point is crucial. Today, with the NEII still just a wish, the most tangible legacy of the conference may well be the spotlight it shone on the challenges inherent in coming to grips with the worldwide glut of technical information. Whatever the fate of an actual national system, it is clear that the conference has already fulfilled its role as a catalyst. "I've seen people taking the ideas we talked about and using them in other ways," says Ina Brown-Woodson, the manager for information services at AT&T Bell Laboratories, noting that principals in several of the digital library projects recently funded by the NSF were at the conference. "If you think in terms of the diffusion of innovation, this conference spurred a lot of new ways of looking at how electronic information could be used. Certainly it brought to the attention of a lot of people that no one was serving as the gatekeeper, or keeping track of the thousand different systems out there."

It is not, to be sure, immediately obvious why keeping track of all those systems, let alone integrating them into one virtual library, should be important. Engineers seem to get along just fine without a national information system. Indeed, their first choice for information is usually down the hall or at the other end of a phone line: studies over the years have shown that engineers tend overwhelmingly to rely on their colleagues to fill in gaps in their knowledge. That habit is so well ingrained that information specialists within the profession label it "the invisible college."

Moreover, there is an enormous and varied array of work already being done to help those engineers who do want to rove farther afield. Using the Internet, the National Institute of Standards and Technology is setting up networks of engineers and technicians involved in manufacturing to help each other with problems that arise in their work. The Institute of Electrical and Electronics Engineers (IEEE), the Boeing Corporation, John Deere, and others are working together to create a national network to help find cost-effective means of developing national manufacturing standards. The NSF's six projects are aimed directly at finding ways of improving electronic access to information. And the Advanced Research Projects Agency (ARPA) of the Department of Defense is sponsoring a range of projects aimed at developing digital libraries and putting their information online.

Even without an NEII, in other words, technical information is, willy-nilly, becoming more accessible. There are those, both within the government agencies funding such work and within the engineering world at large, who believe that with little guidance or oversight from anyone, the forces unleashed by the rise of the Internet will produce an engineering information infrastructure that moves this country into the future.

But another possibility is just as likely. Without some effort to fit new developments in the field of scientific and technical information into a well-conceived structure, we may simply be transposing its already disordered state into digital form. We may, in short, be creating a much speedier version of chaos.

To understand why that is not a particularly enticing vision as far as engineering is concerned, it helps to take a step back and look for a moment at what information engineers need, and at how their needs are changing. For in a sense, information is at the heart of the engineer's craft, which is to take scientific and technical knowledge and apply it to concrete problems. The properties of metals or alloys, the behavior of gases under different conditions, the resistance of different substances to an electrical flow—research into matters like those underpins what engineers do. Engineers are dependent, then, not only on an enormous body of basic scientific and technical knowledge that has already been published, but on an ever-growing knowledge base.

But that is only the beginning. It is how they apply that knowledge that matters, and in that endeavor engineers depend on reams of codes and standards; manufacturers' specifications; previous practices and designs; the results of new research; discoveries revealed in patents; material from government agencies, professional societies, trade associations, and private industry.... The list is formidable. Moreover, different engineers have different needs. Civil engineers need to know local codes and regulations, as well as specifications of standard products—steel I-beams, rivets, and the like. Aerospace engineers, on the other hand, deal in a vast and expanding variety of materials and must stay abreast of cutting-edge research into metals, plastics, electronics, and so on. Meeting the needs of "engineers," in short, means not only providing access to an enormous array of information, but catering

to people who approach the search for information very differently from one another.

The picture gets even more complicated when one factors in one of the more important forces affecting the nature of engineering at the end of the twentieth century: what was once a largely technical set of disciplines is coming under tremendous pressure to expand its horizons. Particularly within the private sector, there is a blurring of the lines that once separated engineers from business strategists, marketing specialists, and others who control the direction a given product might go. American corporate executives, spurred by the success of the team approach used by Japanese and European competitors, are trying to break down the walls that once separated one discipline from another. In a 1994 speech to The Economic Club in Detroit, John F. Welch, Jr., the chairman and CEO of General Electric, argued that a "boundaryless" philosophy is crucial to boosting U.S. corporate competitiveness. "Boundaryless behavior," he said, "laughs at the concept of little kingdoms called finance, engineering, manufacturing and marketing sending each other specs and memos, and instead gets them all together in a room to wrestle with issues as a team."

What that means for engineers is that their jobs, and their information needs, are getting more elaborate. An automotive engineer designing a new dashboard has to work with marketers to make sure that it will find a demand among consumers, with financial planners to ensure it meets cost limits, and with assembly-line foremen to make certain that its production will fit with all the other activities taking place on the assembly line. He or she must, in other words, take a comprehensive view of the impact of each technical decision to be made.

"An engineer no longer has to look just at the technical way he or she gets involved with a project," comments Jean Mayhew, the manager of library and information services at United Technologies' Research Center, "but the technology they put in place has to be designed in a way that keeps in mind marketability, ease of production, price constraints, and the like. So the technical community is being asked to take a much broader look at the impact of its decisions. To do that well, it needs access to information of all sorts, not just technical information." Meeting the information needs of engineers, then, isn't just a matter of covering the various engineering disciplines. It is also a matter of finding ways to provide information about such issues as environmental impacts, health implications, marketing surveys, financial and cost data, and whatever else it takes to complete a job.

If making that wealth of information accessible were simply a way to make engineers' lives easier, the need for an NEII might not be so acute. The fact is, however, that we have reached a juncture in time where making engineers' lives easier has become crucial to boosting the competitiveness of American businesses.

It is, to be sure, difficult to put a dollar figure on the importance of engineering information to the national economy; untangling its part in economic growth from the role played by a host of other factors is almost impossible. As Rutgers economist Paul Kantor noted in his comments to the 1992 NENGIS conference, "Benefits, like human beings, have many ancestors." It may well turn out that the only way to determine the value of improving engineers' access to information is to fail to build a system that does so. As Kantor warned, "It seems certain that the economic giant nations, Japan and Germany, with their long tradition of government-industry cooperation, will seize [a greater] share of the world market, and give us, too late, an indication of how much a NENGIS would have been worth."[1]

Ultimately, the usefulness of any means of distributing information to engineers depends on its ability to give them what they need to create competitive new processes and technologies. That the current state of affairs allows American engineers to create new products and services is not the question; the question is whether it allows them to do so efficiently enough to be competitive in a world in which firms in other countries have a leg up when it comes to obtaining technical information generated by researchers, academics, and even each other.

The evidence suggests that on that score, the U.S. has some ground to make up. In 1976, a study by the General Accounting Office found that industrial companies in Europe had better access to information than those in the U.S., largely because of deliberately designed networks

1. Paul B. Kantor, "Economic Aspects: Costs, Benefits, Sources," in *Final Report on the Conference for Exploration of a National Engineering Information Service* (Ithaca, N.Y.: Cornell Information Technologies and Media Services Printing, 1992), 431-38.

tying together ministries of industry, universities, and manufacturers. That state of affairs has not changed. Melvin Day, former director of the National Technical Information Service, pointed out at the NENGIS conference that Japan, France, and Germany all have prepared national information plans that recognize information services as a key part of the competitive infrastructure of a modern industrialized nation, while the EEC is providing planning and financial support for information developments in its member countries with an eye toward strengthening national technical capabilities. Much more than the U.S., he argued in his speech, governments in Europe and Japan "have both recognized and assessed the extraordinary potential for dominance in the transition from an industrial age to an information age."

That belief has been echoed in a recent report for the Special Libraries Association by José-Marie Griffiths and Donald W. King.[2] In Japan, they note, firms place great value on information and on spending the money it takes to manage it effectively. By contrast, they found in their study of American organizations that there is no overarching information "culture;" in one major company, they report, scientists even had to sneak into the firm library, since their manager insisted that using a library was a waste of time. And the U.S. as a whole, they note, has failed to make effective use of the information it produces. "The net outflow of information from the U.S. is staggering," they write. "Nations like Japan and those in Europe often use information created through U.S. R&D efforts more effectively than the U.S. itself does, thereby giving themselves an information edge over the U.S."

In their study, Griffiths and King conclude emphatically that "the extent of reading by professionals in all environments and disciplines [creates] an information edge that is critical to success." What the proposed National Engineering Information System is designed to do, in essence, is to make it easier for one set of professionals to get its reading done.

Dr. Griffiths, in another study, estimates that engineers spend about three hundred hours a year acquiring and reading information in documents of various kinds, which adds up to about $53.8 billion if a dollar value is attached to their time. Of that amount, roughly 15 percent, or a bit over $8 billion, goes into finding what they need in the first place. If the information needs of engineers are indeed expanding, then so, inevitably, is the amount of time they must spend looking for it and the cost both to their organizations and to the nation of that time.

What this means is that any system that can make the search for information easier is bound to have a direct impact on national productivity and competitiveness. If an engineer can allot two hours a day to seeking and digesting information, then whatever time he or she spends ferreting it out will leave less time for studying it and applying it to the problem at hand. So if we can reduce the amount of time spent seeking information, we can make it easier to spend more time concentrating on the content. And that, it seems safe to say, will raise the productivity of U.S. businesses.

The question that the 1992 NENGIS conference left only partially resolved was how to build the right system for engineers. There was some discussion at the conference of precisely what kind of library engineers might need—an actual collection in a building that would be made available electronically, or a "virtual library" that to its users would seem as if it were a single collection, but in fact would be bibliographies, references, and material contained in computers spread all over the country, if not the globe. By the end, though, it had become clear that if the needs of engineers are truly to be met, the solution would have to be closer to the latter than to the former.

"What has happened in the last five to ten years is that technology has taken us to the point where we no longer think of a library as bricks and mortar," says Jean Mayhew. "Instead, it's the ability of the individual to have access to the information he or she needs, and whatever processes need to be put in place to make that happen. If it turns out the piece of information itself is in New York, or New Orleans, or Los Angeles, as long as the links are in place so that the customer has access, then the perception of information being readily available can be created."

Settling on some form of virtual library, though, is only the first of many questions to be answered. There is, to begin with, the issue of how it should evolve. From a library of core engineering texts? Built on a base of the material available from Engineering Information, Inc.,

2. José-Marie Griffiths and Donald W. King, *Special Libraries: Increasing the Information Edge* (Washington, D.C.: Special Libraries Association, 1993).

and the collection of the former Engineering Societies Library? Or using from the beginning the vast array of information available from professional societies, commercial publishers, and other players in the engineering information field? And if the last option, then how would such a collaborative network be structured—as a not-for-profit corporation, as an ongoing forum of information providers encouraging cooperative efforts, as a joint venture of information providers of all sorts who agree to provide their products and services in a compatible and easily accessible form, or as something else?

It was to resolve such fundamental issues that the participants at the 1992 conference urged the establishment of something they called the "Genesis Group," a body of engineers, academics, and information specialists of high standing. The Genesis Group would both coordinate the efforts to design an engineering system and work to garner support for the whole idea of an NEII.

At the same time, there are a host of technical issues to be resolved in building any national information system. Engineers don't, for instance, all speak the same language. Indeed, there are at least ten different vocabularies codified for engineers, from that used by the Department of Defense to the enormous thesaurus used by Information Handling Services, a commercial information provider. Clearly, any information system will have to be able to sort out the difference between an engineer working for a military contractor interested in tanks and a refinery engineer interested in a very different kind of tank. There are also such matters as building a taxonomy, or organizing structure, for the engineering knowledge the system will handle; developing consistent digital protocols and user-friendly search engines; developing information analysis software; finding ways of reimbursing information providers; and developing means of guaranteeing the quality of the information provided by such a loose and independent set of sources. Questions like these, the conferees envisioned, would be answered in part by independent developments, and in part by projects undertaken at the behest of the Genesis Group.

In the two and a half years since that ambitious agenda was crafted, there has been a measure of progress. A Committee for the Establishment of Genesis (CEG) was formed, and produced a more detailed outline of what structure the Genesis Group would take and what its staffing needs would be; it also drafted a charter dedicating the Genesis Group to advancing the organization and distribution of engineering information in electronic form for the benefit of industry, research, working engineers, and educators. After the summer of 1993, however, the work of the all-volunteer CEG essentially ground to a halt, lacking as it did any money to put the Genesis Group on a permanent footing.

There have been other developments, though, several of them quite promising. Not long after the conference, an Internet listserv was set up to allow participants and interested observers to keep track of developments in the area. David Liston, who was the project manager on the Battelle study of a unified engineering service and is a consultant to the Council, helped carry out a series of focus group sessions with engineers and information specialists in corporate, public utility, and academic institutions. In all those cases, the problems of access to information have, unbidden, become key issues in the discussion. The Council has also funded several projects aimed at creating the discrete building blocks that an engineering information system will need. These include a project by Jelem Incorporated to find and outline the different vocabularies or thesauri used by engineers, an effort at Cornell to organize the engineering resources currently available on the Internet using Gopher and the World Wide Web, and a study by Donald King and the University of Tennessee Center for Information Studies examining published studies of the needs and information-seeking habits of engineers.

Perhaps most significantly, the Council has begun to enlist the help of engineering school faculty and deans, not simply on behalf of the NEII, but in order to see that engineers-in-training learn how to use information resources as a basic tool in their practices. The "invisible college" exists, in part, because engineers tend to be ignorant of the alternatives. "Information is something engineers have never been trained to use," says Margaret Graham, a consulting engineer based in New Jersey. "They have the feeling, 'Oh, that's library stuff, or it's something a clerk can dig out for me.' They just don't understand the wealth that is there for them." For that reason, one of the central initiatives proposed by the NENGIS conference was to inject information training into the engineering curriculum.

The time appears to be right for such an undertaking. The Engineering Deans Council of the American Society for Engineering Education is creating an action plan for engineering education that calls for "integration of knowledge throughout the curriculum." Clearly, the NEII would be one effective way of performing this integrating function. And the response to the Council's probe of interest among engineering deans has been strikingly positive—enough so that it would be well worth convening a meeting to explore ways of moving the initiative forward. "This project should be very valuable in our future instructional efforts," wrote Reid C. Miller, dean of the College of Engineering and Architecture at Washington State University, in a letter to the Council. "More and more, we are using distributed instruction, as well as incorporating information from distributed sources into our instructional programs. One of our weaknesses at present is the lack of easily accessible information."

Nonetheless, the fact remains that funding for the larger enterprise of building a national engineering information system has been hard to come by. In the years since the NENGIS conference, the Council has mailed countless letters and copies of the conference report to influential members of the scientific and technical community in an effort to build support for the NEII concept. Council staff and consultants have met with corporate and professional society leaders and given presentations or speeches to such organizations as the IEEE, the American Society for Engineering Education, the Library of Congress, the Council of Engineering and Scientific Society Executives, and the Transportation Research Board. The Council has sought support from such funders as the Engineering Foundation, the Sloan Foundation, the NSF, the AT&T Foundation, and a host of others. Though many of them have shown interest in the idea, none has backed it with money.

In the end, the problem may be that the NEII is confronted by too many competing agendas. The professional societies, understandably concerned about safeguarding the revenue they earn from providing information to those who subscribe to their services, have been slow to take up its cause. Publishers, though they are well along in thinking about the electronic transmission of their material, are caught up in their own individual explorations of delivery systems. Information specialists, engineers, and the government agencies interested in technical matters are divided over the merits of a national system; many support it, but many either see no need for one or prefer the more incremental but better-funded approach adopted by the NSF.

So the time has come for the Council to find other organizations willing to take up the effort to create the NEII. After four years and an investment of about 10 percent, on average, of its annual expenditures, the Council can say with pride that it helped give the NEII crucial visibility both among engineers and among librarians. But it seems clear that the next step—building the constituency that will produce the money to give the project shape and heft—lies within the engineering world. It is the Council's belief that an organization with close ties to that domain will be better positioned to mobilize its resources.

As it sets about trying to find another institution that can take on the lead role in advancing the NEII, the Council remains convinced of the value of the project. The U.S. is undoubtedly making advances in constructing its information infrastructure, and it is tempting to believe that as the individual pieces fall into place—the NSF digital library projects, say, or projects funded through ARPA or the Department of Commerce—the information needs of engineers will eventually be met. But it is the Council's firm conviction that, while each of those initiatives advances this country a step toward that goal, only an organized effort to integrate them into a coherent whole will produce the payoff we need.

As Theodore Bickart, dean of the College of Engineering at Michigan State University, commented in a recent letter to the Council, "The question today is, 'Can we afford it?' But the question tomorrow will be, 'How can we not afford it?'"

– Robert Gurwitt

INFRASTRUCTURE

Infrastructure resources are those systems, services, and facilities that are drawn upon to help libraries and other information services operate more efficiently and effectively. Through its infrastructure program area, the Council tries to establish continuing communication and cooperation among the various information systems and services that support our libraries and to assure that economic, sociopolitical, technical, and legal changes do not inhibit library functions or access to information by individuals and groups. The Council is interested particularly in finding the key points at which we can help strengthen the information infrastructure.

The Council's infrastructure program area deals with the people, policies, and politics of cooperation and collaboration. It includes communication networks, bibliographic utilities, the software and hardware vendor communities, and the publishing industry. In addition, we consider physical structures (i.e., buildings) to be essential to the delivery of information and an important component of infrastructure.

National Engineering Information Initiative

The Council invested many of its resources this year to encourage a national engineering information initiative (NEII). The first section of this program review provides a complete description of that project to date. Some specific projects were also conducted to support the efforts of the NEII.

The Cornell University Engineering Library has established and is maintaining servers for engineering information on the Internet. Project ICE (Internet Connections for Engineering) is organizing network resources for easy browsing and searching and making them accessible via gopher and World Wide Web (WWW) Internet servers. This project is intended to help demonstrate the range and accessibility of information available to the engineering community. Bibliographic, numeric, image, sound, and video materials will be included. Examples of the types of resources already identified are standards, bibliographic databases, journals, patents, software, animations, statistical compilations, ftp sites, telnet sessions, and gopher and WWW sites. The ICE project can be seen at: http://www.englib.cornell.edu or http://ice.englib.cornell.edu.

The Aerospace Knowledge Diffusion Research Project is investigating the production, transfer, and use of scientific and technical information (STI) for aerospace engineering. The four-phase project is providing descriptive and analytical data regarding the flow of STI at the individual, organizational, national, and international levels. It is examining the information-seeking behavior of engineers and scientists, the channels used to communicate STI, and the social system of the aerospace knowledge diffusion process. The Council provided funds to the project for analysis of the information-seeking behavior of engineering, engineering technology, science, and technology students. The work is being conducted by the Center for Survey Research at Indiana University. The results will provide valuable baseline data about needs, preferences, and expectations regarding technical communication and library use. These results will also be helpful in planning NEII activities for developing engineering information curricula and educational services that will contribute to students' professional competencies.

Ann Bishop continues her investigation into the use of computer networks in aerospace engineering. Her research, begun with dissertation support from the Council, is examining the role computer networks play in the communications aspect of the aerospace industry.

Investigators from the University of Tennessee Center for Information Studies are also examining the topic of information needs and information-seeking habits in engineering. They are developing an annotated bibliography that will provide documentation on the use of information by engineers and scientists. The project builds on an effort already conducted by the Center for Information Studies and the National Science Foundation to assess scientific and technical information dissemination in the United States. The bibliography will contain citations to published and unpublished documents and will include references to studies of scientists' and engineers' needs and uses for all types of information (textual, numeric, graphic, etc.) as well as all formats (hard copy, microform, electronic, etc.).

Setting Library Policies and Priorities in Research Universities

For the last several years, the Council has reported in its annual reports on the activities of several research institutions that were undertaking a fundamental rethinking of their library and information service objectives, while concurrently considering a redefinition of the role of the research library. In the fall of 1993, with most of the projects nearing completion, the Council convened a meeting of project participants to discuss the outcomes of their planning activities. The grants had been awarded to Columbia University, Harvard University, the State University of New York (SUNY) University Center Libraries, and the Triangle Research Libraries Network (TRLN).

A group of twenty-nine individuals, including the grant recipients and invited guests, met at the Arden Conference Center in Harriman, New York, in September 1993. The meeting included an overview of each project by the project team members, followed by questions and discussion among all meeting participants. An evening group discussion concentrated on how the results of the planning activity have changed the way the libraries operate. A second group discussion focused on the planning activity itself and how it was conducted within the institutions.

Several themes emerged from the presentations and discussions: (1) the importance of data to support local decision making, (2) the usefulness of interinstitutional exchange of information, (3) the value of external support for intrainstitutional planning, and (4) the leadership that librarians can provide for institutional planning.

Meeting participants agreed that the importance of data upon which to base decisions cannot be overstated. While intuition is often important, it cannot take the place of substantive data on the use of both information and library services by the library's clientele. As the SUNY Consortium final report noted, "policy must derive from data."

Investigators from Columbia, SUNY, and TRLN shared information with the group about the results of their data-gathering activities. Columbia had surveyed faculty, graduate students, and research staff in three science departments. Their surveys were subsequently modified for use by the TRLN team, and the strong correlation of results from the survey instrument suggests that it could be extended to the broader research library community. SUNY investigators conducted a journal collection overlap study, a periodicals use study, and an interlibrary loan survey. In addition, they undertook a survey of faculty needs for and use of electronic resources.

The fact that results from these projects could be correlated was significant. The surveys conducted by the planning grant libraries confirmed Pareto's law that 20 percent of materials account for 80 percent of use. However, investigators at all institutions also found that browsing continues to be an important activity for library users. In addition, users respond quite positively to electronic access to information and will make use of a wider array of information resources than a print-based clientele.

Project participants acknowledged that one of the more important results of their studies is that they will have to continue the data-gathering activity, especially as their institutional and technological environments change. Regular and periodic user surveys, interviews, focus groups, etc., have become a necessary component of their ongoing planning processes.

An additional benefit from the planning process included an acknowledgement of the leadership role that librarians can take in institutional planning. As an academic unit with contact across the institution, libraries are uniquely positioned to address a range of planning issues within research institutions. Another identifiable benefit of this kind of intrainstitutional planning process was the ability to strengthen each library's relationship with its administration. The academic administrators who participated in the planning activities stated that they now had a better appreciation for the complexity of research library management and planning.

Additional planning grant activities this year included a November 1993 conference on "Gateways to Knowledge," sponsored by the Harvard College Library, which presented a series of panel discussions on the concept of a gateway and the changing role of academic libraries in learning, teaching, and research.

Also in November 1993, the Triangle Research Libraries Network held a symposium to review the results of their planning project and to discuss their future plans. In

addition to summarizing their data-gathering and focus group session information, the symposium attendees were brought up to date on the status of the Model University Copyright Policy Initiative. That model policy grew out of the TRIN planning process and was developed to encourage new means for effective dissemination of research, especially in science and engineering scholarly journals. The model has been widely disseminated and discussed in the library, publishing, and academic communities.

It is likely that all of the institutions receiving the strategic planning grants would have conducted some sort of planning activity with or without external funding. However, the imprimatur of the Council's sponsorship and the requirement that library planning take place within the context of the larger institution ensured the necessary attention and involvement of the parent institution's administration. The planning processes set in motion by this grant program are expected to continue.

Institutional Planning

The results of the strategic planning grants made by the Council to research libraries demonstrate the importance of intrainstitutional planning. In Maryland, Towson State University is beginning a strategic planning process to integrate information resources within the campus planning context, focusing on information management and literacy. Included in the planning process is an assessment and documentation of the information needs of and current technologies available to the campus community, a definition of strategies for developing the information resources and technologies of the university, and establishment of a feedback and planning process for adjusting strategies as needs and technologies change. Higher education literature suggests that many institutions have an expressed interest in institutional planning and the development of models for the integration of library, computing, media, and telecommunication services. The documentation from this project should be of use to other institutions of similar size and mission.

In 1987, the Council on Library Resources provided a grant to the University of Minnesota to plan for the development of an Integrated Information Center. The plan was developed, and the university subsequently received federal funds to implement and evaluate a model for integrating information delivery in a networked campus environment. The model envisioned an organizational entity that included a variety of information technologies to provide scholarly and administrative information to faculty and staff. Members of the university staff who participated in the planning and development process reported on the progress of their activities at the 1993 Annual Meeting of the American Society for Information Science.

Institutional Collaboration

The roles and responsibilities of librarians in the creation of electronic instructional materials and collaborative project development are being assessed as part of a Rice University project to create a hypertextual multimedia resource for a new course in the history of science. Included in the Galileo Project are a comprehensive hypertextual bibliography, a collection of maps, a general timeline of European history from 1500 to 1700, and the animation of Galileo's observations and experiments. As text and images are incorporated into the resource, appropriate links are being constructed. The project makes use of NCSA Mosaic as both the development and deployment technology and, when completed, will be made available to the larger public. The faculty member and librarian involved in the project have been working together to create linkages that will provide meaningful navigational guides for the students who will take the course in the spring of 1995.

Telecommunications and Information Infrastructure Policy

Representatives from national library and information associations met in September 1993 to discuss their common interests in policy issues related to the National Information Infrastructure (NII). The institutions represented included: American Association of Law Libraries; American Association of School Librarians; Association of College and Research Libraries; American Library Association and its Committee on Legislation, its Ad Hoc Subcommittee on Telecommunications, and its Committee on Intellectual Freedom; Association for Library & Information Science Education; Association of Research Libraries; Association of Specialized and Cooperative Library Agencies; American Society for Information

Science; Council on Library Resources; Chief Officers of State Library Agencies; Coalition for Networked Information; Library and Information Technology Association; Medical Library Association; Public Library Association; and Special Libraries Association. The group reached consensus on some key principles related to first amendment, privacy, intellectual property, ubiquity, equitable access, and interoperability issues. The representatives agreed that libraries will play several key roles in the evolving national information infrastructure, including providing and consuming information, protecting public access, and serving as a source for public access. The Council provided support for the production and distribution of a brochure, "Principles for the Development of the National Information Infrastructure," and the meeting's proceedings.

Standards

The National Information Standards Organization (NISO) is continuing its work on technical standards for library binding as well as for the inclusion of information in advertisements, catalogs, promotional materials, and packaging for products used for the storage, binding, or repair of library materials. The Council provided funds to NISO in 1991 to develop these standards.

Scholarly Communication

Concerned about tensions between librarians and publishers over the costs of scholarly communication, the Council approached the Association of American Publishers (AAP) to look for possible solutions to resolve some of the strains in the relations between the two groups. It was decided that facilitated meetings of knowledgeable individuals from both groups might lead to a productive outcome.

A Joint Working Group on Professional and Scholarly Information in the Electronic Age was established by the Council and the AAP to discuss the functions that publishers and librarians perform, how each group adds value to the information it handles, how key economic issues challenge both old and new ways of doing business, and how electronic delivery of information may change traditional roles and economics. Seven librarians and seven publishers met to hold facilitated discussions three times between December 1993 and May 1994 to explore how each performed parallel but separate functions. As an important outcome from the discussions, members of both groups have acknowledged that they knew less about the other's roles than they thought. If publishers and librarians do not fully understand each other's work, then authors, scholars, researchers, and university administrators are even less likely to know. The Joint Working Group hopes that one result of their deliberations will be a wider and more complete understanding by all segments of the academic community of the roles and tasks undertaken by publishers and librarians.

During the course of the discussions, the Joint Working Group concluded that although the electronic age may change the methods by which their functions are performed (and, in some cases, who performs them), the scholarly community's need for these functions will remain. In some cases, the need may even increase. Nonetheless, difficult economic issues and other challenges could limit publishers' and librarians' ability to realize the benefits of new technologies. The Joint Working Group questioned whether changes made possible by electronic publishing could be implemented in economically beneficial ways, either by changing the mix of function or changing the information products, or by creating new working relationships and alliances. One final question was deemed important as well: how to inform the other participants in the information cycle about what librarians and publishers contribute to the value of professional and scholarly communication, in both traditional print and electronic publications. A report from the group is expected in early 1995.

Network Advisory Committee

The Council provides modest resources in support of the program activities of the Network Advisory Committee (NAC). The members of the committee include U.S. organizations formally constituted and functioning in the public and private (for-profit or not-for-profit) sectors that are actively engaged in regional or nationwide networking of library and information services, or have a significant impact on the development of nationwide networks providing library and information services.

The December 1993 meeting considered the theme of "Network Content—A Dialogue With Publishers." Representatives from publishing houses, academic libraries,

and networks talked together about the current network environment, electronic information, the economics of publishing, concerns of publishers and librarians about networked information, and what users of networked information services want.

The importance of the need for substantive dialogue between publishers and librarians cannot be overstated. The meeting was especially valuable for the broad set of perspectives and issues that participants brought to the discussion. Economics was a major concern for publishers, commercial and academic alike. Publishers want protection of their own and their authors' rights, security to assure authorized presentations of their information, and a fair return on their investment. Both publishers and librarians add value to networked information and both need to face the new electronic environment. A recognition and restatement of the roles each plays in the scholarly communication process is needed. While network and system managers might regard the Internet as being valuable for experimentation, more stability is needed for it to be a serious publishing option. Publishing challenges include how to manage issues such as transitory information, currency, navigation, technical capabilities, security, authentication and authorization, and billing. According to speakers who addressed the user perspective, the focus should be on services, not products. Full proceedings of the meeting will be published as part of the Library of Congress Network Planning Paper series.

The Network Advisory Committee next met in June 1994 to consider the theme of "Net Connections." The meeting was intended to update NAC members on developments affecting the public interest in the national information infrastructure and to inform NAC members of the status and outlook for community and civic networks.

The program began with Robert Gillespie (Robert Gillespie Associates), who provided an overview of the specific legislative initiatives before Congress at that time. David Lytel (Information Infrastructure Specialist, Office of Science and Technology Policy, The White House) spoke about the Clinton/Gore administration's interest in and policies for the national information infrastructure.

Community network issues were presented by Ronald Doctor, Associate Professor, School of Library and Information Studies, University of Alabama; Christinger Tomer, Assistant Professor, School of Library and Information Science, University of Pittsburgh; Richard Civille, Director, Washington Office, Center for Civic Networking; Joseph Wienecko, Blacksburg Electronic Village; Robert Croneberger, Executive Director, The Carnegie Library of Pittsburgh; and Elizabeth Curry, Executive Director, Southeast Florida Information Network.

Members of NAC also had the opportunity at this meeting to advise the Library of Congress on the draft of its strategic plan to create a national digital library. The proceedings of this meeting will also be published as a Network Planning Paper.

Network Planning Paper No. 24, "Multimedia and Networking," based on the December 1992 NAC meeting, was published and distributed in 1993. Network Planning Paper No. 25, "Educating for Networking–Building New Partnerships," based on the June 1993 NAC meeting, was published and distributed in 1994.

Community Networking

A pilot evaluation of the Blacksburg Electronic Village Project was conducted by Scott J. Patterson of the Virginia Polytechnic Institute and State University; Andrea Kavanaugh of the Blacksburg Electronic Village; and Ann Bishop, University of Illinois at Urbana-Champaign. The Blacksburg Electronic Village is a joint effort of the Virginia Polytechnic Institute and State University, the Town of Blacksburg, Virginia, and the C&P Telephone/Bell Atlantic Company. Over the course of three years, high-speed data connections and Internet access will be brought to homes, schools, libraries, and businesses in the community of Blacksburg. The project serves as a prototype for bringing interactive library resources to people in the community. For purposes of the evaluation project, the investigators established evaluation methods and techniques that will help developers make their system more responsive to the needs of users. Sampling and analysis were conducted for individuals using the beta version of the system interface. Three data collection techniques were utilized: self-reported background questionnaires, self-reported surveys of experiences, and focus group interviews of users. The analysis addressed the motivations for using the system, present and future users, problems and sources of user support, and perceived impacts of the Blacksburg Electronic Village.

Increased library involvement, specifically for training and support functions, was recommended.

A survey of the attitudes of municipal and county officials toward public libraries in the areas of services, value, and funding will be conducted by the Library Research Center, University of Illinois at Urbana-Champaign. This will be a national survey, based on a stratified random sample of municipal officials, and should provide the library community with useful information about issues of funding for library services by local government entities.

International Activities

The Council's support for the Robert Vosper IFLA Fellows Program took on special significance this year with the death of Robert G. Vosper in May 1994. Dr. Vosper, a long-time member of the Council's Board of Directors and an Honorary Fellow of IFLA (International Federation of Library Associations and Institutions), was pleased to have his name linked to a program that was focused on supporting library leadership at the international level and was proud of the accomplishments of those selected to participate in the program.

This year, project reports were received from Fellows Program participants Michèle Valerie Cloonan and Wendy Smith on preservation education, Georgeta Clinca on cataloging in publication, and Barbara Stefaniak on Western literature availability in Polish libraries.

HUMAN RESOURCES

To a great extent, a library's human resources are its most important. While collections of resources can and do exist independently, it is the services developed and provided by individuals in institutions (i.e., librarians and libraries) that help to make resources easily and readily available to constituent groups. The focus of the Council's human resources program is to encourage the development of the next generation of leaders who will build and manage the information support systems needed by society. In addition, the Council continues to look for ways to assist current library leaders to transform their institutions in response to the changing needs of their communities.

LEADERSHIP AND DEVELOPMENT

Information Services Leadership

With support from the W.K. Kellogg Foundation, the Council is embarking on a major program to address information services leadership issues for the future. The Kellogg Foundation is supporting over three years of CLR efforts to build networks, foster dialogue, and develop leaders within the library and information science community. This program is just beginning and will attempt to articulate the role and function of libraries within the evolving information infrastructure, identify how best to train library leaders to participate in and influence public dialogue, and explore the educational issues related to developing new leaders. The program will identify innovative individuals and programs and will encourage the transfer of successful efforts to other environments. Planned program activities include convening meetings and developing human networks to share information about common problems and possible solutions. Leadership development planning activities such as mentor, fellowship, and recruitment programs will also take place.

ACRL/CLR College Library Director Mentor Program

New college library directors are learning from the experience of seasoned directors by participating in the CLR-supported College Library Director Mentor Program. The new directors also benefit from the camaraderie fostered by the program. Through the efforts of the Leadership Committee of the College Libraries Section, Association of

College and Research Libraries, fifteen pairs of mentors and new directors took part in the program during 1993/94. Program coordinator is Larry Hardesty, Director of Library Services, Eckerd College.

As with the first year's program, new directors are matched with experienced college library directors who serve as their coaches, guides, and peers as new responsibilities are faced. Participants in the program are nominated by academic deans who have recently hired new directors, or the new directors themselves may ask to be part of the program. The Council supports campus visits, telephone communications, and a three-day seminar. In first year of the program, the seminar was held at the end of the new directors' first year. This year, the seminar was held midway through the new directors' first year, in conjunction with the American Library Association's Midwinter meeting. Participants reported the mid-year gathering to be even more beneficial, as it also provided a means for the new directors to develop their own collegial support group.

The Council provided financial resources for the first two years of the College Library Director Mentor Program and, in the spring of 1994, approved a grant to extend the program for two more years. Participants from the 1992/93 and 1993/94 programs are listed on page 42. The program's success has generated interest from other groups who are beginning to consider a similarly structured mentoring program as a good model for leadership development.

Future of Library Education

The Palmer School of Library and Information Science, Long Island University, completed a survey of the library and information science literature and produced an analytical bibliography on the future of library and information science education. The bibliography addresses topics such as accreditation, curriculum, continuing education, interdisciplinary linkages, international perspectives, recruitment, specialization, technology, and theory versus practice. In addition to an annotated bibliography, citations for unreviewed works are included. The analysis of the literature revealed a lack of vision of the future of education for the field. Most of the writings identified for this bibliography are opinions or suggestions about what changes should be made in library education, and curriculum is often the target of those recommendations for change.

The work on the project was carried out by Rae Packard, Michael J. Robinson, and Jill Sabia, students in the Master of Science in Library Science program of the Palmer School. Anne Woodsworth, Dean of the School, served as principal investigator. The report, *The Future of Education for Librarianship: Looking Forward from the Past*, was published by the Council in the spring of 1994.

Multiculturalism and the Library Science Curriculum

The Graduate School of Library and Information Studies at Queens College/CUNY completed a series of seminars/workshops on multiculturalism and diversity in libraries. The purpose of the workshops was to gather together library and information science professionals and educators to discuss the implications of social change on the clientele, operations, services, and collections of libraries and information centers. The seminar discussions would help in the development of an agenda for discussion of the curriculum changes needed to improve the preparation of professionals who will be serving diverse communities.

Separate sessions were held for types of libraries (school, public, academic, and special) and for library and information science educators. The meeting format included keynote speakers followed by panel discussions or breakout sessions. The speakers included: Andrew Hacker, author and professor of political science at Queens College; Howard Dodson, Chief, The Schomburg Center for Research in Black Culture, New York Public Library; Dr. Joseph Fernandez, President of School Improvement Service, Inc., and former Chancellor of the New York City Schools; Kriza Jennings, Diversity Consultant for the Association of Research Libraries; and W. David Penniman, Council on Library Resources.

The seminar discussions did not result in suggestions for significant changes in the curriculum, but rather suggestions for inclusion of multicultural elements to the existing curriculum. Two additional and unanticipated major themes – recruitment for the profession and faculty development – were also identified.

Knowledge and Skills for Health Information Professionals

Education and training for health information professionals of the future were outlined in the report, *Platform for Change*, published by the Medical Library Association (MLA) in 1991. Articles by Fred W. Roper and M. Kent Mayfield about the Medical Library Association's Knowledge and Skills Task Force, published this year, give an overview of the professional attributes and technical capabilities required of the health sciences librarian in the future. The National Library of Medicine established a panel on the education and training of health science librarians as a direct response to the recommendations of the MLA task force. The panel was charged to analyze possible programs and activities to ensure that society will benefit from the skills and contributions of health science librarians.

Research and Reports

Recruitment and Promotion

An article on equal opportunity and affirmative action guidelines by Ellen Altman and Patricia Promis was based on their research into management hiring in academic libraries. The investigators conclude that the commitment to diversity has not yet filtered down to those who make hiring decisions, since people chosen to fill open positions closely resemble their predecessors.

Position Classification

Anne Woodsworth and Theresa Maylone prepared a report for CAUSE, the association for managing and using information technology in higher education, that investigated the information job family. The investigators summarized a CLR-supported study that tested a methodology to analyze the presence and degree of similarities in job content, particularly of jobs in libraries and academic computing centers on campuses where there has been a high degree of information technology integration. Sixty-three distinct jobs in libraries and computing centers were analyzed for the levels of skills, knowledge, responsibilities, and other compensable factors. A small number of jobs could be considered identical, a larger number were similar, and only a few contained no similarities. One of the unanticipated by-products of the study was a recognition of the development of common terminology for position classification. As an exploratory study, the results were interesting to researchers. However, if the study is to be useful for day-to-day management, it needs to be applied in a broader variety of settings.

Preservation Education

Two Robert Vosper IFLA Fellows addressed preservation education as part of their fellowship activities. Wendy Smith has developed a series of interactive training modules in preservation management for use in Southeast Asia and the Pacific regions. The training materials are modular to encourage individuals to develop practical policies and procedures for their own institutions. Michèle Valerie Cloonan prepared a report that looks at the historical background, current practices, and potential opportunities for preservation education. She conducted a questionnaire and extensively interviewed individuals currently involved in preservation activities. Her identification of the strengths and weaknesses of the current climate acknowledges the retrenchment of university programs and the closing of library schools. Cloonan concludes her report with suggestions for the IFLA Preservation and Conservation (PAC) Core Programme and the Section on Conservation. Increased use of electronic technology for information dissemination, encouragement for more research on preservation strategies, and joint sponsorship of continuing education programs are some recommended strategies to encourage the growth of the field of preservation education.

Standards for Ethical Conduct

The Council provided support in 1989 to the Association of College and Research Libraries for the development of standards to guide the actions of individuals and institutions entrusted with the care of culturally significant materials. The *Standards for Ethical Conduct for Rare Book, Manuscript, and Special Collections Librarians, 2nd ed.*, was published in 1994. These standards supersede and significantly expand upon a first edition published in 1987 and were developed by ACRL's Rare Books and Manuscripts Section and other interested professionals. The standards were approved by ACRL and the American Library Association. Accompanying the standards are guidelines, which, combined with the standards, can be used to guide and assist members of this segment of the profession and the agencies they serve.

ECONOMICS

The Council's economics program serves as a focal point for the investigation and discussion of how libraries can allocate their financial resources to maximize the benefits of the services provided. Determining how best to invest limited resources is a major challenge for libraries today. The desire to provide new services, the multiple formats for information delivery, and the need to update or acquire new technologies to meet service demands continue to put a strain on library budgets.[1] In addition, the price escalation of scholarly journals, particularly in the science and technology fields, has contributed in large measure to the economic crisis faced by many libraries.

The studies in the economics program area this year again continue the focus on microeconomic issues. The topics addressed in this year's program include document delivery, serial pricing, costs of networked information, cost/benefit analyses, and assessment. The Council continues to emphasize the application of total quality management tools for the improvement of library operations. Support for the Council's economics program area has been provided by the William and Flora Hewlett Foundation.

Document Delivery and Interlibrary Loan

Libraries are moving to an access instead of ownership model since they are increasingly unable to purchase all of the materials desired by their constituencies. Document delivery and interlibrary loan have been promoted as viable substitutions for onsite collection holdings. However, as reported in last year's annual report, studies of the costs of interlibrary loan services in research libraries show that those costs, too, are high.

The North American Interlibrary Loan and Document Delivery (NAILDD) Project was launched by the Association of Research Libraries (ARL) as one response to the need to reconceptualize interlibrary loan and document delivery (ILL/DD) services. The Council provided partial support for an ARL Visiting Program Officer to coordinate the initiative. The ARL Access Committee is spearheading the effort in collaboration with a broad group of library vendors, software developers, document delivery suppliers, and libraries. The project seeks to promote developments that will facilitate the delivery of materials to users at costs that are sustainable to libraries. Mary E. Jackson serves as the ARL Program Officer.

Project activities have included the identification of priorities for making technical improvements to online ILL/DD systems, the formation of a Developers/Implementors Group (DIG), presentations and promotions of the project to libraries of all types and related organizations, and the development of a workshop to encourage the reconceptualization of ILL/DD services in libraries.

The State University of New York University Center Libraries at Albany, Binghamton, Buffalo, and Stony Brook are studying the costs of access compared with the costs of ownership for selected high-cost research journals. The study is using a theoretical economic model developed by Bruce R. Kingma, Assistant Professor, Department of Economics & School of Information Science and Policy, University at Albany. The model will help to determine cost savings, financial efficiency, and economic efficiency of local ownership compared with document delivery via a consortium of the SUNY University Center Libraries or commercial supply/delivery services. The optimal rules for using one of the model's three alternatives will depend on the marginal and fixed costs of each alternative and the expected level of use. The model has been broadened to examine problems of the optimal number of members of the consortium, copyright royalties, and patron opportunity costs and benefits of access to journal articles.

The study will use the economic models and data collected to develop two cost-benefit analyses of document delivery. The first analysis will focus on the library cost savings of local ownership versus access via different document delivery alternatives enhanced by the use of document scanning and transmission equipment. The second analysis will focus on the users' opportunity cost for each of the document delivery alternatives. The research project has four distinct phases: a journal identification study, an alternative access study and data collection, cost analysis and modeling, and completion of project studies and dissemination of results.

The SUNY University Center Libraries previously received a strategic planning grant from the Council on Library Resources that resulted in information on collection overlap, patterns of interlibrary loan use, journal use at

each of the four campuses, delivery time and reliability, the use of journal titles and the cost of faxing copies of articles from journals owned by the libraries, and faculty opinions of acceptable interlibrary loan delivery times. This study is building on that prior research.

Serial Pricing

Articles based on an econometric analysis of the determinants of library subscription prices of the top-ranked economics journals by co-investigators George A. Chressanthis and June D. Chressanthis, Mississippi State University, were published this year. The investigators examined the role of publisher monopoly power, exchange rate risk, manuscript submission fees, and several other factors that influence journal subscription prices. They found that changes in journal circulation were found to have a relatively less important impact on the determination of price variations than has been posited in other studies.

Cost Centers for Scholarly Communication

The Coalition for Networked Information (CNI) is investigating the life cycle of the scholarly and scientific communication process to identify the cost centers that will experience the greatest effects due to the increased significance of networks and networked information. They also will recommend some strategies for measuring those effects over time. The economics of networked information has been a strong and persistent theme at the meetings and discussions of the Coalition. Many members believe that the emergence of a fully functional system of networked scholarly and scientific communication and publication is impeded by uncertainty about how costs will be incurred, how benefits will be derived, and how prices will be established within that system. The cost center analysis and measurement strategies developed by project investigator Paul Evan Peters, CNI Executive Director, for this study will serve as a baseline for tracking trends in the scholarly communication process.

Costs and Beneficial Impacts of Library Operations

Investigators Paul Kantor and Tefko Saracevic, Alexandria Project Laboratory, School of Communication, Information and Library Studies, Rutgers University, are developing guidelines and a workbook to enable other libraries inexpensively to survey the positive impacts (i.e., benefits) they have on their communities of users. This research study is breaking new ground by developing a taxonomy or classification of benefits in a language that users provide themselves. Interviews of library users were conducted at Columbia University, New York University, Princeton University, Rutgers University, and the University of Maryland, College Park. The analysis of the interviews with faculty members and students is providing the necessary working language upon which the taxonomy will be based.

Assessment

A seminar on assessment factors for academic libraries was sponsored by the Graduate School of Library and Information Science, University of Texas; Texas A&M University; and the Council on Library Resources. Assessment was defined as affixing a value for the purpose of determining how well libraries are meeting the needs of their users. The purpose of the meeting was to identify those factors that are not solely quantitative in nature. A preliminary list of assessment factors was identified and is being further developed by meeting participants.

Total Quality Management (TQM)

The Association of Research Libraries is testing the applicability of benchmarking methodologies in an academic library environment by examining three interlibrary loan subprocesses: (a) borrowing, (b) lending, and (c) delivery. A small-scale study of three institutions will lead to the development of a dynamic model of procedures that can be refined or adapted by other members of the academic library community. Investigators note that libraries often collect operational data such as cycle time, requests satisfied, and the number of institutions contacted per request, and the pilot study has identified a lack of performance measures useful for benchmarking processes. Libraries have not systematically collected customer satisfaction or need fulfillment information in a standardized way.

The *First International Conference on TQM and Academic Libraries* was held in April 1994 and was sponsored by the Association of Research Libraries Office of Management Services and the Wayne State University Libraries, with some support from the Council. Twenty-four sessions

were organized around six themes: (1) fostering organizational change using TQM principles, (2) forging partnerships with clients and vendors, (3) applying TQM to library functions, (4) making effective use of teams, (5) using TQM processes and tools, and (6) managing and leading in the TQM environment. Over 140 participants attended the conference to learn from experts and to exchange ideas about how best to implement continuous improvement methods in academic libraries.

ACCESS AND PROCESSING

Throughout its history, the Council on Library Resources has continually sought ways to improve the methods by which libraries acquire, organize, store, retrieve, reproduce, and make available information for efficient use by the communities they serve. We consider library resources to be not only their collections of materials, but also their information services; both are used to help users answer questions and solve problems, or to assist users in professional or personal development. The Council's access and processing program looks for new approaches to enhance access to information and encourages improvement in the internal processes performed by our libraries so that the resources invested in libraries are used more efficiently and effectively.

The Future Library

In 1945, Vannevar Bush popularized the concept of an electronic library by describing his vision of a memex.[1] This concept has been revisited many times in the intervening fifty years, most often by those in library and technology fields. While Bush and the other writers since then have suggested that the future library will soon be with us due to the improvements and use of technology, the Council has observed that we have not yet developed those systems that truly meet our users' requirements. Today's technology, however, may take us closer to creating the library of the future.

Since much has been written lately about the future electronic or digital library, the Council contracted with the University of Michigan School of Information and Library Studies to conduct an analytical review of the literature. Karen M. Drabenstott served as principal investigator. The purpose of this review was to note the trends, topics, issues, and concerns identified by the many individuals writing about the library of the future. Included in the report is a collection of definitions, overviews of current technologies and tools, a discussion of digital library models, brief descriptions of some active projects, and a concluding section that discusses the future. Since a review of this type could never be entirely

1. Vannevar Bush, "As We May Think," *Atlantic Monthly* 176, no. 1 (July 1945): 101-8.

comprehensive, the document was made available both in print and electronically, with the expectation that readers would continue to add their own references to the bibliography.

Response to the announcement of the document's availability came quickly and positively as organizations and individuals placed orders, sometimes requesting multiple copies for institutional planning purposes. The Council believes that the document fulfilled its function to provide an overview for those who had just begun to think about how to transform their libraries for the future and as a reference source for those who have specific interests and need a general framework in which to think about the future library.

Charles Hildreth continues his investigation of the catalog of the future. He is exploring which current projects are likely to be potential models for the future catalog and what characteristics will be necessary to transform current, static catalogs into dynamic information access and delivery systems.

Mary Micco completed her Council-supported research project concerned with developing an online catalog search system that incorporates aids for clustering and organizing useful retrieval sets. With a colleague, Rich Popp (Computer Science Department, Indiana University of Pennsylvania), she reported the findings of the ILSA (Intelligent Literature Search Assistant) project. With each step of the project, the feasibility of the concept of clustering has been tested and the limitations imposed by different hardware and software configurations have been examined. The final report recommends that systems can improve subject access for the user with the following techniques: increased use of classification systems and associated data, weighting terms by the strength of their contribution to the "aboutness" of an item, filtering, facetting based on subdivision of subject headings, truncation options, and sorting options. The ILSA prototype was developed using an object-oriented multimedia user interface on six NeXT workstations with two databases: the first with 100,000 MARC records and the second with 20,000 additional records enhanced with table of contents data. Source code developed for the project is available.

Information Search Process

Catholic University of America investigator Ingrid Hsieh-Yee reported on a study that looked at how scholars obtain the information necessary to conduct their research. Faculty in two disciplines (English and engineering) working at four universities in the Washington, D.C., metropolitan area were surveyed to learn how they searched for information in an online system. The findings confirm previous studies by showing that scholars use more than one method to obtain needed information. The top three methods reported in this study were: (1) checking personal collections, (2) following references from books or articles, and (3) searching the online catalog. It was no surprise to learn that the factors most important in their choice of methods were: (1) previous success, (2) convenience, and (3) ease of use.

A cooperative research project at Dickinson College will test a teaching/learning method designed to help undergraduate students understand the nature of scientific communication. Kristin Senecal, Librarian, and Michael Holden, Assistant Professor, Chemistry Department, will develop a bibliographic instruction module to guide students through a "paper trail" of references about chemical reactions to find seminal articles and to help the students learn how scientists build on the works of those who come before them. Students will write final essays on their searches, and debriefings about the process will be conducted. The same students will be questioned later in their academic careers to learn of any long-term effects of this training method.

Maxine Reneker investigated the information-seeking activities of thirty-one members of the Stanford University academic community for two-week periods during the 1990-91 academic year. A set of 2,050 information-seeking incidents were gathered using informant tape recordings, interviews, and other textual data. Information needs were examined using both quantitative and qualitative analyses, which revealed that information seeking is embedded in day-to-day tasks. These information-seeking activities can be triggered by a statement of need or by the availability of information.

Barbara M. Wildemuth and Margaret E. Moore of the University of North Carolina at Chapel Hill analyzed and evaluated 161 MEDLINE searches conducted by third-

year medical students to determine which search behaviors were used, whether the individual moves were effective, and whether there is a relationship between specific search behaviors and the effectiveness of the search strategy as a whole. The typical search took fourteen cycles, used seven terms or concepts, and resulted in the display of eleven citations. The most common moves were selecting a database, entering single-word terms and free-text term phrases, and combining sets of terms. Syntactical errors were common. The searches were judged to be adequate, and students were quite satisfied with their own searches. However, many missed opportunities were identified in the search strategies, including underutilization of the controlled vocabulary, subheadings, and synonyms of search concepts.

University of California, Santa Cruz, librarians Terry Ellen Ferl and Larry Millsap reported on the results of their study to analyze search behavior of remote users of the University of California MELVYL Library System. Transaction logs provided data on the number and type of searches done by remote users, their choice of search mode, the database selected, the number of retrievals, the number and type of errors, and their use of help functions. The search data were cross-tabulated with demographic data. While brief known-item searching seemed to be effective for 40 percent of the users, the remaining 60 percent conducted longer search sessions that did not appear to be as successful. The investigators concluded that more and better design elements that guide or lead users are needed. Especially necessary are methods to help users reformulate searches originally resulting in zero hits, as well as techniques to restructure searches that result in very large retrieval sets.

This year Ferl and Millsap are continuing their research by examining the behavior of in-library users of public access catalogs. They are utilizing an online questionnaire and examining the transaction logs of complete online search sessions to identify the successes as well as the problems users have with the online catalog. Demographic data are being collected, and the full results will be compared with their previous study of remote user experience. The investigators expect that the majority of in-library use is being conducted by undergraduate students. They are particularly interested in subject search behavior and will examine the logs of subject searches to see to what degree users' entry terms match authorized subject terms. They will also examine the degree to which title-word searching is actually an alternative form of subject searching.

A study completed by University of Illinois at Chicago researchers looked at how persistent users are in displaying postings resulting from online search queries. The project team of Stephen E. Wiberly, Jr., Robert Allen Daugherty, and James A. Danowski observed when users began and ended their search sessions, questioned users about their backgrounds and their sessions, and extracted and examined transaction logs. The study found that the behavior of users who display some, but not all, of the postings retrieved corroborates earlier evidence that users normally display no more than thirty to thirty-five postings. However, the behavior of users who display all postings compared to those who display none show that the former outnumber the latter until the number of postings retrieved exceeds two hundred.

A report by the Japan Information Access Project on access to and use of Japanese information argues that yesterday's conventional wisdom suggesting a lack of interest in Japanese information has been replaced by today's users, who are discipline-oriented and recognize that information from Japan is a part of the larger corpus of knowledge. The report includes an essay, recommendations, and selected papers from a symposium on *Japanese Information: Access, Use & Demand*, held February 25, 1992, with partial support from the Council.

Bibliographic Control

In February 1993, a Cooperative Cataloging Council (CCC) was formed and charged itself to develop a useful strategic plan for increasing the effectiveness of cooperative cataloging among the nation's libraries. Members of the CCC are: Liz Bishoff, OCLC; John Byrum, Library of Congress; Carol Mandel, Columbia University; Sue Phillips, University of Texas at Austin; Karen Smith-Yoshimura, Research Libraries Group; Pat Thomas, Stockton-San Joaquin County Public Library; Sarah Thomas, Library of Congress; and Linda West, Harvard University.

The CCC established issue-oriented task groups to focus on specific goals and/or objectives defined by the CCC members; the Council provided support for their meet-

ings. The task groups and chairs were: (1) More, Better, Faster, Cheaper (Brian Schottlaender, UCLA); (2) Availability and Distribution (Michael Kaplan, Harvard University); (3) Authorities (Barbara Tillett, University of California, San Diego); (4) Standards (Willy Cromwell, Stanford University); (5) Cataloger Training (Joan Swanekamp, Columbia University); and (6) Foreign MARC (John Byrum, LC). The task forces produced action plans, methodologies, and timelines to address their assigned topics. Information was collected throughout the summer and early fall of 1993, and the reports and recommendations from the task groups were delivered to the CCC.

The task force reports and subsequent discussions with the Cooperative Cataloging Council have led to a new, shared vision for cooperative cataloging. The following key decisions were made to assure that useful, timely, and cost-effective access can be made to library collections:

- Creation of a new international cooperative cataloging program, the Program for Cooperative Cataloging (PCC), which has both an authority component and a bibliographic component
- Endorsement of a core bibliographic record that can be accepted without modification or can be dynamically enhanced, depending on local priorities and resources
- Development of simple, user-friendly documentation
- Promotion of a training program that emphasizes cataloger judgment and a bibliographic process that supports user needs for timely and useful access
- Formation of a Foreign MARC Coalition to facilitate access to records produced outside North America
- Annual production of 200,000–600,000 authority records by 200 participants and 100,000–200,000 bibliographic records created by 20–50 program participants (exclusive of the Library of Congress) by the year 2000

A strategic plan for the next five years has been developed by the Cooperative Cataloging Council and was widely disseminated to the library community. The CCC is working on governance issues and has established additional task forces to address specific questions; active monitoring is under way by the members of the CCC.

In a presentation for the Fifth Japan-U.S. Conference on Libraries and Information Science in Higher Education, Henriette D. Avram gave a paper on developments in networking and bibliographic control, based on analysis she had conducted for the Council.

Henry L. Snyder and Heidi L. Hutchinson of the University of California, Riverside, analyzed the varying catalog rules used to create bibliographic records for materials of the Hand Press Era, 1450–1825. This study was conducted to determine the feasibility of creating a cooperative European database and union catalog of such materials. Twenty-eight members of the Consortium of European Research Libraries selected the Research Libraries Group (RLG) to supply database support for this union catalog.

Martha Andrews of the Institute of Arctic and Alpine Research, University of Colorado, developed a plan for distributing the responsibilities among libraries and information providers to provide access to polar literature. The plan was needed to address the problem of uneven bibliographic coverage of the literature. A systematic analysis was undertaken to identify the problem areas associated with both overlapping coverage and lack of coverage. Duplication and gaps not only cause problems for users, but also result in the inefficient use of both public and private resources. Included in the plan are a final core list of polar regions journals, results of analysis of the library catalog statistics and overlapping coverage in databases, and recommendations for action. Presentations on the plan have been received positively by the polar information community. As a result of the project, negotiations are already under way to reduce duplication in the indexing of the literature.

Georgeta Clinca surveyed CIP (cataloging in publication) programs in several countries to investigate their progress over the last twenty years, the nature of the bibliographic data being recorded, and what trends can be determined for the future. While national bibliographic agencies play a valuable role by continuing to contribute standardized bibliographic descriptions, the increase of publications in both scope and format creates a large demand on their services and strains their resources. Ms. Clinca, a Robert Vosper IFLA Fellow, noted that progress in automation and telecommunications technologies may provide a means to decentralize some of the CIP responsibilities.

The report also includes a suggested plan for implementation of a CIP program in Romania.

A study by Barbara Stefaniak, also conducted under the auspices of the Council's IFLA Vosper Fellows Program, includes the results of an investigation of the availability of Western periodical literature in Polish research libraries from 1980 to 1991. Although most collections were small, they did seem to meet their users' needs. Bibliographic access was found to be unsatisfactory, and recommendations for technical, political, and management improvements are included in the final report.

Vocabularies and Thesauri

Marcia Bates is continuing a project to investigate how additional vocabulary can be added to the machine-readable database of the *Library of Congress Subject Headings (LCSH)*.

The Working Group on Form and Genre Vocabularies meets annually to continue the process of rationalization of form and genre terminologies in major thesauri. The Council is providing partial support for these meetings, which are being held in August of each year at the offices of the Art and Architecture Thesaurus (AAT). The meetings are organized by Laura Stalker, The Huntington Library, and participants include representatives of the major published vocabularies that include form and genre terms.

The Council provided grants to OCLC and the University of Michigan in 1987 to conduct analyses of the data files that libraries use to build their bibliographic and authority databases and to carry out an extensive, empirical study of the subject terms that end users enter into online catalogs. The results of that research were incorporated into a new book by Karen Markey Drabenstott and Diane Vizine-Goetz, published this year, on the use of subject headings for online retrieval. The authors describe subject analysis and subject searching in online catalogs and address the limitations of those techniques. They also characterize user queries and analyze system responses to give the reader ideas on precision, browsing, and the means to produce better retrievals. A new approach to subject searching, the exact approach, is introduced and advocated. The researchers suggest that system design and programming can overcome some searching limitations, but also suggest changes that could be made to the Library of Congress Subject Headings system.

Harriet Hemmasi, Rutgers University, completed work on a preliminary music thesaurus. Music headings from the Library of Congress Subject Headings (LCSH) and terms from the Dewey Decimal Classification, 780 schedule (20th edition), were transferred to Anderson Rowley Information Systems (ARIS), a thesaurus construction software program.

Under the direction of the unified Agricultural Thesaurus Project Team (with membership from the National Agricultural Library, the United Nations Food and Agriculture Organization, the Center for Agricultural and Biological Sciences International, and the Zentralstelle für Agrardokumentation und -information), a study was conducted to determine the means to solve the problems of duplication of effort in thesaurus maintenance and the complexity of searching agricultural materials. An analysis of existing systems was conducted, and the report includes a recommendation for a new system and a proposed governance structure to manage a unified thesaurus.

Preservation

Lois Olcott Price, Senior Conservator of the Conservation Center for Art and Historic Artifacts, continues work on her manuscript on the fabrication and preservation of American architectural drawings to 1930. Improved preservation and collection care for architectural drawings and photoreproductions of them are the objectives of this project.

Use of Technology

Cornell University has been producing high-resolution digital copies of original images held in their Division of Rare and Manuscript Collections. To investigate how such images can be included in the research and teaching process, the Council is providing partial support for the development of a multimedia collection access tool. The project will support the design and development of remote access to these images by faculty, staff, and students, and will evaluate the effectiveness of such access. The primary objective of the project is to design and test a flexible composing tool. While some projects utilize single-purpose applications, this project proposes

to address the potential of the digital library not by prescribing the application, but by letting the users themselves explore the variety of information resources available to create their own compositions. H. Thomas Hickerson, Carl A. Kroch Library, and Geri Day, Department of Communication, will investigate users from a diversity of disciplines as well as levels of education and expertise. Utilizing interviews, think-aloud protocols, and data from interactive computer tracing systems, they will assess how teaching and research needs can be met by providing appropriate multimedia access tools.

Lloyd A. Davidson and Gilbert K. Krulee, Northwestern University, have developed a prototype workstation that provides an academic library user with easier access to multiple databases. The investigators report that while technical limitations can be overcome, a significant investment in hardware would be required. Access to resources available over the Internet can be managed, but major difficulties arise in accessing remote CD-ROM databases due to their multiple formats and retrieval systems.

COMMITTEES, MEETINGS, & PROGRAM PARTICIPANTS

Joint Publishers and Librarians Working Group on Professional and Scholarly Information in the Electronic Age (Sponsored by CLR and the Association of American Publishers)

Janet Bailey
Elsevier Science Publishing Company

Betty Bengtson
University of Washington

Harold Billings
University of Texas at Austin

Robert Bovenschulte
New England Journal of Medicine

Carol Fenichel
Hahnemann University

Robert Grant
CRC Press

Christine Harris, Facilitator

Maggie Irwin
John Wiley & Sons

Barbara Meredith
Association of American Publishers

W. David Penniman
Council on Library Resources

Sarah Pritchard
Smith College

John Saylor
Cornell University

Linda Scovill
Scovill, Paterson Inc.

Robert Shirrell
University of Chicago Press

Elaine Sloan
Columbia University

CLR Proposal Reviewers

David Bishop
Northwestern University

Martin Cummings
Council on Library Resources

Ronald Larsen
University of Maryland

Margaret Otto
Dartmouth College

CLR Strategic Planning Grant Participants Meeting
September 9-10, 1993

Association of Research Libraries

Duane Webster

Columbia University

Patricia Burch
Anthony Ferguson
Kathleen Kehoe
Dan King
Vace Kundakci
Barbara List
Ujwal Ranadive
Carol Mandel
Elaine Sloan

Council on Library Resources

Julia Blixrud
Martin Cummings
W. David Penniman
Basil Stuart-Stubbs

Harvard University

Mary Beth Clack
Richard De Gennaro
Susan Lee

State University of New York

Judy Adams (Buffalo)
Meredith Butler (Albany)
Suzanne Fedonek (Binghamton)
Steve Roberts (Buffalo)
Barbara von Wahlde (Buffalo)
Jack Smith (Stony Brook)

Triangle Research Libraries Network

Edward Brooks (UNC-Chapel Hill)
Gary Byrd (UNC-Chapel Hill)
John Graham (Duke University)
Connie McCarthy (Duke University)
Suzanne Striedieck (North Carolina State University)
Ross Whetten (North Carolina State University)

Committee on Economics
October 30, 1993

David Breneman
Harvard University

Malcolm Getz
Vanderbilt University

Paul Kantor
Rutgers University

Michael McPherson
Williams College

Duane Webster
Association of Research Libraries

Richard West
University of California
(Chair, Research Libraries Task Force on a National Strategy for Managing Scientific and Technical Information Needs, Association of American Universities)

Julia Blixrud, CLR
Martin Cummings, CLR
W. David Penniman, CLR

College Library Director Mentor Program

1992/1993

New Directors

Patricia Basu, Hiram College
Ron Bryson, Campbellsville College
Paul Chervenie, College of Saint Elizabeth
Lynn Scott Cochrane, Marymount University
Charlene Cole, Tougaloo College
Joyce Davis, Catawba College
Marion Gallivan, Gannon University
Carla Wise Jacobs, Union University
Trisha Morris, Ohio Dominican College
Elizabeth Mosby, Livingstone College
Mary Jane Scherdin, Edgewood College
Sue Stroyan, Illinois Wesleyan University
Kristi Tornquist, Southern Arkansas University
Vandelia Van Meter, Spalding University

Mentors

Mignon Adams, Philadelphia College of Pharmacy and Science
Lynne Blair, Rhodes College
Stan Campbell, Centre College
Oakley Coburn, Wofford College
Evan Farber, Earlham College
Michael Haeuser, Gustavus Adolphus College
Damon Hickey, College of Wooster
Tom Kirk, Berea College
William Murdock, Pace University
Sue Myers, Austin College
Jim Parks, Millsaps College
Lennart Pearson, Presbyterian College
Carolyn Sheehy, North Central College

1993/94

New Directors

Susan Allen, Kalamazoo College
Mark Cain, College of Mount St. Joseph
Lisabeth Chabot, Mary Baldwin College
Connie Dowell, Connecticut College
Karen Fischer, University of Minnesota, Morris
Rita Gulstad, Central Methodist College
Theodore Hostetler, Randolph-Macon Woman's College
Kris Huber, Saint Olaf College
Carol Johnson, College of St. Catherine
Eugenia McKee, Maryville University
Dennis Norlin, South Dakota School of Mines and Technology
Julia Rockwood, Nyack College
Theodosia Shields, Dillard University
Patricia Stukes, Morris College
Adu Worku, Pacific Union College

Mentors

Judith Armstrong, Drury College
Stephanie Bangert, Saint Mary's College of California
Willis Bridegam, Amherst College
Susan Campbell, York College
Joel Clemmer, Macalester College
Oakley Coburn, Wofford College
Caroline Coughlin, Drew University
Evan Farber, Earlham College
Norma Hervey, Luther College
John Jaffe, Sweet Briar College
David Jensen, Hope College
Mike Kathman, Saint John's University (Minnesota)
Harold Smith, Park College
Mary Lee Sweat, Loyola University (New Orleans)
Ronnelle Thompson, Augustana College

Part I. Publications of the Council and CLR Staff

CLR Reports (newsletter—irregular).

The Council on Library Resources: Shaping a Foundation for the Future (booklet). 1994.

Drabenstott, Karen M. *Analytical Review of the Library of the Future*. Washington, D.C.: Council on Library Resources, 1994.

Penniman, W. David. "Shaping the Future for Libraries Through Leadership and Research." In *Libraries and the Future: Essays on the Library in the Twenty-First Century*, edited by F. W. Lancaster, 5–15. Binghamton, N.Y.: Haworth Press, 1993.

_____. "Tomorrow's Library." *Computer Methods and Programs in Biomedicine* 44 [in press].

Timmet, Ellen B. "Council on Library Resources, 1993." In *The Bowker Annual Library and Book Trade Almanac*, 39th ed., 280–86. New Providence, N.J.: Bowker, 1994.

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* Altman, Ellen, and Patricia Promis. "Affirmative Action: Opportunity or Obstacle." *College & Research Libraries* 55, no. 1 (January 1994): 11–24.

Avram, Henriette D. "Database Networking." In *Japan-U.S. Collaboration in Enhancing International Access to Scholarly Information: Looking Toward the 21st Century*, 298–307. Fifth Japan-U.S. Conference on Libraries and Information Science in Higher Education, Tokyo, Japan, October 6–9, 1992. Tokyo, Universal Academy Press, Inc., 1993.

Bishop, Ann Peterson. "The Role of Computer Networks in Aerospace Engineering." *Library Trends* 42, no. 4 (Spring 1994): 694–729.

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Branin, Joseph J., George D'Elia, and Thomas W. Shaughnessy. "Implementing an Integrated Information Center in an Academic Setting: Research in Progress." In *Proceedings of the 56th Annual Meeting of the American Society for Information Science*, vol. 30, 217–20. Medford, N.J.: Learned Information, Inc., for the American Society for Information Science, 1993.

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* _____. "Publisher Monopoly Power and Third-Degree Price Discrimination of Scholarly Journals." *Technical Services Quarterly* 11, no. 2 (1993): 13–35.

* _____. "The Relationship between Manuscript Submission Fees and Journal Quality." *Serials Librarian* 24, no. 1 (1993): 71–86.

Cloonan, Michèle Valerie. *Global Perspectives on Preservation Education*. IFLA Publications 69. Munich: K.G. Saur, 1994. ISBN 3-598-21796-X

Drabenstott, Karen Markey, and Diane Vizine-Goetz. *Using Subject Headings for Online Retrieval: Theory, Practice, Potential*. San Diego: Academic Press, 1994. ISBN 0-12-221570-2 LCCN 93-42568

Educating for Networking—Building New Partnerships: Proceedings of the Library of Congress Network Advisory Committee and the Association of Library and Information Science Education, June 13–15, 1994. Network Planning Paper no. 25. Washington, D.C.: Library of Congress, 1994.

Ferl, Terry Ellen, and Larry Millsap. "Remote Use of the University of California MELVYL Library System: An Online Survey." *Information Technology and Libraries* 11, no. 4 (September 1992): 285–303.

Goodhue, Dale L., Diane Lending, and Russell Littlefield. "Methods for Measuring the Impact of an Integrated Information Center: Research in Progress." In *Proceedings of the 56th Annual Meeting of the American Society for Information Science*, vol. 30, 225–30. Medford, N.J.: Learned Information, Inc., for the American Society for Information Science, 1993.

Hayes, Robert M. *Strategic Management for Academic Libraries: A Handbook*. Westport, Conn.: Greenwood Press, 1994. ISBN 0-313-28111-4

* Hemmasi, Harriette. "ARIS Music Thesaurus: Another View of LCSH." *Library Research & Technical Services* 36, no. 4 (December 1993): 487–503.

Lee, Susan. "Organizational Change in the Harvard College Library: A Continued Struggle for Redefinition and Renewal." *Journal of Academic Librarianship* 19, no. 4 (September 1993): 225–30.

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Lund, Douglas C., and Nancy Herther. "The Impact of Technology on the Service and Structure of an Integrated Information Center: Research in Progress." In *Proceedings of the 56th Annual Meeting of the American Society for Information Science*, vol. 30, 221–24. Medford, N.J.: Learned Information, Inc., for the American Society for Information Science, 1993.

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Micco, Mary, and Rich Popp. "Improving Library Subject Access (ILSA): A Theory of Clustering Based in Classification." *Library Hi Tech* 12, no. 1 (1994): 55-66.

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** Reneker, Maxine H. "A Qualitative Study of Information Seeking Among Members of an Academic Community: Methodological Issues and Problems." *Library Quarterly* 63, no. 4 (October 1993): 487-507.

Rohde, Nancy Freeman, and Nancy Herther. "Staffing an Integrated Information Center and Its Implications for the Education of Information Professionals." In *Proceedings of the 56th Annual Meeting of the American Society for Information Science*, vol. 30, 231-34. Medford, N.J.: Learned Information, Inc., for the American Society for Information Science, 1993.

Roper, Fred W., and M. Kent Mayfield. "Shaping Medical Library Education." *Library Trends* 42, no. 1 (Summer 1993): 25-44.

_____. "Surveying Knowledge and Skills in the Health Sciences: Results and Implications." *Bulletin of the Medical Library Association* 81, no. 4 (1993): 396-407.

Smith, Wendy. "Education for Preservation." *International Preservation News*, no. 7 (December 1993): 8-9.

Snyder, Henry L., and Heidi L. Hutchinson. *Cataloging of the Hand Press: A Comparative and Analytical Study of Cataloging Rules and Formats Employed in Europe*. Munich: K.G. Saur, 1994. ISBN 3-598-23400-7

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"Standards for Ethical Conduct for Rare Book, Manuscript, and Special Collections Librarians, with Guidelines for Institutional Practice in Support of the Standards, 2d edition, 1992." *College & Research Libraries News* 54, no. 4 (April 1993): 207-15.

Williams, Roger M. "Librarians and Publishers: The Twain Met." *Against the Grain* 6, no. 1 (February 1994): 52-55.

_____. "The Library of Congress Network Advisory Committee." *PSP Bulletin* 8, no. 1 (Spring 1994): 1-4.

Woodsworth, Anne, and Theresa Maylone. *Reinvesting in the Information Job Family: Context, Changes, New Jobs, and Models for Evaluation and Compensation*. CAUSE Professional Paper Series #11. Boulder, Colo.: Published by CAUSE in cooperation with the Association of College & Research Libraries and College and University Personnel Association, 1993.

Part III. Project Reports Received

Many project reports are published in the professional literature. Authors retain ownership of the reports and are asked to submit copies to the ERIC database. ERIC document numbers that have been reported to CLR are listed at the end of the citation. Inquiries about reports without an ERIC number should be addressed to the primary author or contact person.

American Library Association. Telecommunications and Information Infrastructure Policy Forum. "Proceedings: Principles for the Development of the National Information Infrastructure." Library and Information Technology Association, 1994.

_____. "Principles for the Development of the National Information Infrastructure" (brochure). Library and Information Technology Association, [1994].

** Andrews, Martha. "Distributing Responsibilities for Accessioning and Indexing Polar Regions Information." Final Report to the Council on Library Resources. Institute of Arctic and Alpine Research, University of Colorado, November 30, 1993.

Blake, Virgil L. P. "The American Mosaic: Mapping Curriculum Reform." Final report. Graduate School of Library and Information Studies, Queens College, 1994.

Clinca, Georgeta. "The Functioning of CIP." International Federation of Library Associations and Institutions UBCIM Core Programme, 1993. Contact: Universal Bibliographic Control and International MARC (UBCIM), Deutsche Bibliothek, Zeppelinallee 4-8, W-6000 Frankfurt/Main 1, Germany

"Columbia University Scientific Information Study." August 27, 1993. Contact: Tony Ferguson, Associate University Librarian, Columbia University

"Cooperative Information Resources Development: A Constituency Based Policy Analysis." Final Report. Triangle Research Libraries Network, January 1994. Contact: Joe Hewitt, Associate Provost for University Libraries, University of North Carolina at Chapel Hill, CB# 1900, 201 Davis Library, Chapel Hill, NC 27514-8890

* Davidson, Lloyd A., and Gilbert K. Krulee. "A Prototype Workstation for Interrogating Multiple Sources of Information." Final Report. Northwestern University, [1994].

Hardesty, Larry. "The College Library Director Mentor Program" [First Year Report]. Eckerd College, September 1993.

* Hsieh-Yee, Ingrid. "The Information-Seeking Patterns of Scholars and Their Use of an Online Information System." Final Report. Catholic University of America, [1994]. Contact: Assistant Professor, School of Library and Information Science, Catholic University of America, Washington, DC 20064

First International Conference on TQM and Academic Libraries. Conference Notebook. Washington, DC: Association of Research Libraries, 1994.

Micco, Mary. "ILSA Project." Final Report. Indiana University of Pennsylvania, December 1993.

_____. "Intelligent Literature Search Assistant (ILSA) User Manual." Version 1.0. Indiana University of Pennsylvania, June 1993.

_____. "Intelligent Literature Search Assistant (ILSA) Installation Manual." Version 1.0. Indiana University of Pennsylvania, June 1993.

"The Next Dimension: Academic Library Assessment Factors." GSLIS, University of Texas, 1994. Contact: Irene B. Hoadley, Director, Evans Library Capital Campaign, Texas A&M University, College Station, TX 77813-1125

Patterson, Scott J., Ann Bishop, and Andrea Kavanaugh. "Preliminary Evaluation of the Blacksburg Electronic Village." Final Report. Virginia Polytechnic Institute and State University, [1994]. Contact: Scott J. Patterson, Department of Communication Studies, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061-0311

State University of New York University Center Libraries. "Final Report to the Council on Library Resources on the Cooperative Planning Grant." July 1993. Contact: Barbara von Wahlde, Associate Vice President for University Libraries, University at Buffalo.

Stefaniak, Barbara. "Availability of Western Periodical Literature in Polish Libraries." Final Report. Warsaw, July 1992. ISBN 0-7123-2097-0 (available from IFLA International Programme for UAP, c/o The British Library, Document Supply Centre)

"Understanding the Needs for Japanese Information with a Special Emphasis on Science and Technology." Symposium Report. Japan Information Access Project, July 1, 1994. Contact: Japan Information Access Project, 1706 R Street, N.W., Washington, DC 20009

"Unified Agricultural Thesaurus: Feasibility Study on the Use of an Universal Thesaurus in Agricultural Science Databases." Copenhagen, Denmark: DataCentralen, November 1993. Contact: Pamela Q.J. Andre, National Agricultural Library, 10301 Baltimore Boulevard, Beltsville, MD 20705-2351

Wiberley, Stephen E., Jr., Robert Allen Daugherty, and James A. Danowski. "User Persistence in Displaying LUIS Postings." University of Illinois at Chicago, July 23, 1993.

* Wildemuth, Barbara M., and Margaret E. Moore. "End User Searching of MEDLINE." Final Report. University of North Carolina at Chapel Hill, August 3, 1993. ED 361 357

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* = *Cooperative Research Project Report*

** = *CLR Fellows Report*

PROGRAM GUIDELINES AND GRANT APPLICATION PROCEDURES

The Council on Library Resources supports work by individuals and organizations on matters pertinent to libraries and information services, with a primary objective to improve their quality and performance. Since the Council's programs are broad and its program descriptions general, there is continuing refinement and adjustment to the scope of projects funded. Individuals with specific interests and expertise are encouraged to take the initiative and propose for consideration projects within the program areas described in this report: infrastructure, human resources, the economics of information services, and access and processing.

In addition to the general program grants, the Council sponsors the CLR Fellows program and the Cooperative Research program, both of which encourage research projects and the development of research skills by individual professionals. The programs are described in brochures available from CLR.

While CLR, in consultation with its advisors, often initiates and promotes work in its program areas, exploratory correspondence and conversation are always welcome, and all proposals receive careful consideration.

Advice to Applicants

The most efficient means to contact the Council is with a letter or electronic communication. Initial inquiries should state the purpose of the work, indicate methodology, establish the credentials of the responsible individuals, and provide an estimate of the total costs and funding requirements. Enough information should be provided to enable CLR staff to determine whether or not the inquiry falls within the Council's program interests. Letters of application will be briefly acknowledged upon their receipt, but because CLR prefers to operate with a small staff, detailed responses may take more time. If substantive replies are not received within a reasonable period of time, applicants should feel free to make a follow-up inquiry. There are no submission deadlines for general program grants, but the special programs have announced deadlines.

If subsequent exploration seems justified, preparation of a complete proposal will be suggested. Full documentation should include:

1. A concise description of the proposed project.
2. A thorough explanation of the work to be done, including project objectives and background information on the need for the project.
3. Specific methodology to be used.
4. A timetable for the project.
5. A detailed budget linking costs to project components.
6. Plans for evaluation of the project and dissemination of project results.
7. Concise and pertinent curricula vitae of the principal investigators.

Proposals are first reviewed by CLR staff and, when necessary, external technical advisors. All proposals are considered for relevance to current CLR interests and activities; relationship to other, similar work; projected costs in the context of the work described; and importance of anticipated results. The Council also looks for evidence of institutional support, including cost sharing. Grant applications are generally reviewed also by an external proposal review committee, and proposals over $25,000 need approval from the CLR Board of Directors, which meets twice a year (usually in May and November). However, even proposals that are to be recommended for Board approval cannot in every case be reviewed at the first meeting following their receipt. All inquiries and proposals are reported to the Board, including those declined at the staff and review committee level.

Exclusions

The Council does not provide support for construction, renovation, or other capital improvements. Support is not provided for collection acquisitions, routine operating costs, activities judged to be of limited influence, or work that essentially repeats previous research. CLR does not fund indirect costs. Equipment purchases are also generally not supported, unless integral to a research project.

Contact

Inquiries should be addressed to Julia C. Blixrud, Program Officer, Council on Library Resources, 1400 16th St., N.W., Suite 510, Washington, DC 20036 (202-483-7474 voice, 202-483-6410 fax, clr@cni.org Internet)

ACTIVE PROJECTS
FINANCIAL STATEMENTS

GRANTS AND CONTRACTS ACTIVE IN FISCAL 1994 (unaudited)

	Unpaid 6/30/93	FY 1994 Grants and Contracts (Adjustments)	FY 1994 Payments (Refunds)	Unpaid 6/30/94
American Association of Engineering Societies *Washington, D.C.*				
Planning a thesaurus of engineering and scientific terms	1,500	-0-	1,500	-0-
Association of Research Libraries *Washington, D.C.*				
ARL visiting program officer	10,700	-0-	10,000	700
Benchmarking pilot project	-0-	17,540	12,500	5,040
Interlibrary loan cost study	2,000	-0-	2,000	-0-
International conference on total quality management and academic libraries	-0-	2,500	2,250	250
Marcia Bates *Van Nuys, California*				
Examine the possibility of expanded entry vocabulary for Library of Congress subject headings	6,000	-0-	-0-	6,000
California State University *Chico, California*				
Packet radio Internet extension	1,048	-0-	-0-	1,048
Catholic University of America *Washington, D.C.*				
The information-seeking patterns of faculty members and their use of an online system	3,513	-0-	3,513	-0-
Coalition for Networked Information *Washington, D.C.*				
To establish an analytical framework and baseline for networked information resources and services	-0-	25,000	-0-	25,000
Columbia University *New York, New York*				
Recasting scientific information delivery	42,306	(8)	42,298	-0-
Conservation Center for Art and Historic Artifacts *Philadelphia, Pennsylvania*				
Research on the preservation and fabrication of American architectural drawings to 1930	1,916	-0-	1,916	-0-
Cornell University Engineering Library *Ithaca, New York*				
Managing engineering information resources on the Internet	-0-	14,000	13,000	1,000

	Unpaid 6/30/93	FY 1994 Grants and Contracts (Adjustments)	FY 1994 Payments (Refunds)	Unpaid 6/30/94
Cornell University Library				
Ithaca, New York				
Development of a multimedia collection access tool	-0-	24,677	-0-	24,677
Dickinson College				
Carlisle, Pennsylvania				
Bibliographic instruction in the field of chemistry	-0-	1,900	-0-	1,900
Eckerd College				
St. Petersburg, Florida				
College library director mentor program (1992-1994)	4,000	-0-	-0-	4,000
College library director mentor program (1994-1996)	-0-	22,600	-0-	22,600
Harvard University				
Cambridge, Massachusetts				
Strategic planning process	50,000	-0-	50,000	-0-
Charles R. Hildreth				
Springfield, Illinois				
Study of functionality of online catalogs	10,000	-0-	1,000	9,000
The Huntington Library				
San Marino, California				
Working group meetings on form and genre vocabularies	-0-	4,000	4,000	-0-
Indiana University				
Bloomington, Indiana				
NASA knowledge diffusion research project	-0-	9,568	9,000	568
Indiana University of Pennsylvania				
Indiana, Pennsylvania				
Hypermedia for improved subject access	1,100	-0-	1,100	-0-
Vocabulary control tools for online searching	2,852	-0-	2,852	-0-
Supplement	-0-	1,089	1,089	-0-
Japan Information Access Project				
Washington, D.C.				
Symposium on access to, use of, and demand for Japanese information	500	-0-	-0-	500
Johns Hopkins University				
Baltimore, Maryland				
Information-seeking process among population studies researchers	500	-0-	-0-	500
Knowledge management: expanding the scholarly role of research libraries	22,897	-0-	22,897	-0-
Kansas State University				
Manhattan, Kansas				
National preservation plan for the historical literature of agriculture	750	(8)	742	-0-

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	Unpaid 6/30/93	FY 1994 Grants and Contracts (Adjustments)	FY 1994 Payments (Refunds)	Unpaid 6/30/94
Library of Congress *Washington, D.C.* Inaugural meeting of the Cooperative Cataloging Council	1,961	(289)	1,672	-0-
Library and Information Technology Association, American Library Association *Chicago, Illinois* Forum in telecommunications and information infrastructure policy issues	-0-	15,000	10,000	5,000
Long Island University *Brookville, New York* An analytical bibliography on library and information science education	3,000	-0-	3,000	-0-
National Information Standards Organization *Bethesda, Maryland* Development of technical standards for the preservation of library materials	10,000	-0-	-0-	10,000
Queens College *Flushing, New York* Seminar series on mapping curricular revision	3,100	-0-	-0-	3,100
Rice University *Houston, Texas* The Rice humanities electronic studio	35,000	-0-	30,000	5,000
Rutgers University *New Brunswick, New Jersey* Study of the costs and beneficial impacts of library functions	72,612	-0-	60,000	12,612
Special Libraries Association *Washington, D.C.* Development of continuing education course on total quality management	6,000	-0-	452	5,548
Towson State University *Towson, Maryland* Strategic planning for information resources	-0-	10,000	9,000	1,000
University at Albany Foundation *Albany, New York* Study of costs and benefits of access compared to ownership costs for high-cost research journals	-0-	54,012	15,000	39,012
University of California *Los Angeles, California* Elucidation and validation of the knowledge used by reference librarians	891	-0-	891	-0-
Technology and structure of research libraries	1,000	-0-	1,000	-0-

	Unpaid 6/30/93	FY 1994 Grants and Contracts (Adjustments)	FY 1994 Payments (Refunds)	Unpaid 6/30/94
University of California *Santa Cruz, California* Study of search patterns of in-library online catalog users	-0-	4,083	3,800	283
University of Colorado *Boulder, Colorado* Distributing responsibilities for accessioning and indexing polar regions information	3,190	(47)	3,143	-0-
University of Illinois *Chicago, Illinois* Users' persistence in scanning postings in an online public access catalog	1,330	-0-	1,330	-0-
University of Illinois, The Library Research Center *Urbana, Illinois* Study of attitudes of municipal and county officials toward public libraries	-0-	12,000	11,000	1,000
University of Michigan *Ann Arbor, Michigan* An analytical report and bibliography of the library of the future	1,000	(232)	768	-0-
University of Tennessee *Knoxville, Tennessee* An annotated bibliography of the information needs and information-seeking habits of scientists and engineers	-0-	4,800	4,000	800
University of Texas *Austin, Texas* Seminar on academic library assessment factors	-0-	1,700	-0-	1,700
Virginia Polytechnic Institute and State University *Blacksburg, Virginia* Blacksburg electronic village project	9,665	(3)	9,662	-0-
Current year adjustments: other refunds and adjustments from prior years' grants and contracts	-0-	(12,889)	(12,889)	-0-
Totals	$310,331	$223,469 (13,476)	$345,375 (12,889)	$187,838

INDEPENDENT AUDITORS' REPORT

TO THE BOARD OF DIRECTORS
COUNCIL ON LIBRARY RESOURCES, INC.
Washington, D.C.

We have audited the statement of financial position of COUNCIL ON LIBRARY RESOURCES, INC. as of June 30, 1994, and the related statements of activities, and cash flows for the year then ended. These financial statements are the responsibility of the Council's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of COUNCIL ON LIBRARY RESOURCES, INC. as of June 30, 1994, and the results of its operations and its cash flows for the year then ended in conformity with generally accepted accounting principles.

As discussed in Note B to the financial statements, in 1994, the Council changed its method of accounting for grants and contracts, its method of financial reporting, and its financial statement presentation to comply with the requirements of new accounting pronouncements.

Our audit was conducted for the purpose of forming an opinion on the basic financial statements taken as a whole. The accompanying supplementary information is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

Hoffman Dyker? Fitzgerald, P.C.

Vienna, Virginia

August 30, 1994

Council on Library Resources, Inc.

STATEMENT OF FINANCIAL POSITION

JUNE 30, 1994

ASSETS

Cash and cash equivalents	$ 323,800
Investments	1,567,475
Grants receivable - temporarily restricted	520,000
Other assets	30,336
Total assets	$2,441,611

LIABILITIES AND NET ASSETS

Accounts payable and accrued expenses	$ 22,784
Grants and contracts payable	187,838
Total liabilities	210,622

NET ASSETS:

Unrestricted (Note B)	939,476
Temporarily restricted	1,291,513
Total net assets	2,230,989
Total liabilities and net assets	$2,441,611

SEE NOTES TO FINANCIAL STATEMENTS

Council on Library Resources, Inc.

STATEMENT OF ACTIVITIES

FOR THE YEAR ENDED JUNE 30, 1994

	Unrestricted	Temporarily Restricted	Total
REVENUE:			
Grants and contracts	$ -	$ 991,798	$ 991,798
Interest income	56,851	3,805	60,656
NET ASSETS RELEASED FROM RESTRICTIONS:			
Satisfaction of program restrictions	146,221	(146,221)	-
Expiration of time restrictions	300,000	(300,000)	-
Total net assets released from restrictions	446,221	(446,221)	-
Total revenue	503,072	549,382	1,052,454
EXPENSES:			
Program services:			
Human resources	100,891	-	100,891
Access and processing	97,881	-	97,881
Economics	175,136	-	175,136
Infrastructure	274,792	-	274,792
Total program services expenses	648,700	-	648,700
Development	113,659	-	113,659
Administration	251,634	-	251,634
Total expenses	1,013,993	-	1,013,993
Cumulative effect on prior year of a change in method of accounting for grants and contracts (Note B)	-	742,131	742,131
CHANGE IN NET ASSETS	(510,921)	1,291,513	780,592
NET ASSETS, BEGINNING OF YEAR	1,450,397	-	1,450,397
NET ASSETS, END OF YEAR	$ 939,476	$1,291,513	$2,230,989

SEE NOTES TO FINANCIAL STATEMENTS

Council on Library Resources, Inc.

STATEMENT OF CASH FLOWS

FOR THE YEAR ENDED JUNE 30, 1994

CASH FLOWS FROM OPERATING ACTIVITIES:	
Change in net assets	$ 780,592
Cumulative effect on prior year of a change in method of accounting for grants and contracts:	
Temporarily restricted net assets	(742,131)
Adjustments to reconcile change in net assets to net cash used in operating activities:	
Increase in grants receivable	(7,000)
Decrease in other assets	8,867
Increase in accounts payable and accrued expenses	5,217
Decrease in grants and contracts payable	(122,493)
Net cash used in operating activities	(76,948)
CASH FLOWS FROM INVESTING ACTIVITIES:	
Purchase of investments	(2,349,675)
Sale of investments	2,542,367
Net cash provided by investing activities	192,692
NET INCREASE IN CASH AND CASH EQUIVALENTS	115,744
CASH AND CASH EQUIVALENTS, BEGINNING OF YEAR	208,056
CASH AND CASH EQUIVALENTS, END OF YEAR	$ 323,800

SEE NOTES TO FINANCIAL STATEMENTS

NOTES TO FINANCIAL STATEMENTS

JUNE 30, 1994

A. Organization

Council on Library Resources, Inc. is a not-for-profit organization incorporated under the laws of the District of Columbia in 1956 for the purpose of promoting library research.

The Council's operations are financed through unrestricted general support grants and through several restricted grants from private foundations and other sources. The Council conducts its work through directly administered projects as well as grants to and contracts with other organizations or individuals.

B. Summary Of Significant Accounting Policies

The significant accounting policies followed in the preparation of the financial statements are described below:

Basis of accounting

The financial statements of the Council have been prepared on the accrual basis.

Grant revenue and recognition of grantor restrictions

The Council reports grants as temporarily restricted support if they are received with grantor stipulations that limit the use of the grants as to time or purpose. When a grantor time restriction expires or expenditures are made that satisfy the restricted purpose of those grants, the purpose of the restriction is accomplished and temporarily restricted net assets are reclassified to unrestricted net assets and reported in the Statement of Activities as net assets released from restrictions. Support that is restricted by the grantor is reported as an increase in unrestricted net assets if the restriction expires in the reporting period in which the support is recognized.

Grants and contracts payable

Grants and contracts made by the Council are recorded as grants and contracts payable and as an expense at the time recipients are awarded the grants or contracts. Current period expenses are reduced for grant or contract refunds or over appropriations when received.

Cash and cash equivalents, and investments

Cash and cash equivalents consist primarily of deposits in a money market mutual fund. Cash equivalents represent investments with original maturities of 90 days or less. Investments which consist of treasury bills, of which approximately $467,700 is temporarily restricted, are recorded at cost which approximates market. Interest which is not restricted by the related grants is recognized as unrestricted revenue.

Functional allocation of expenses

Costs of providing the various programs have been summarized on a functional basis in the accompanying financial statements. Certain indirect costs which include rent and other expenses are identified as support services costs and have been allocated directly to programs, development and administration on a systematic basis. Salaries and travel costs have been allocated directly to programs, development and administration on a time-allocated basis.

Board designated net assets

The Board of Directors had designated a portion of unrestricted net assets for various short-term projects. Also, $ 800,000 was designated as an administrative reserve to cover future operating needs of the Organization.

Financial statement presentation

In 1994, the Council elected the early adoption of Statement of Financial Accounting Standards ["SFAS"] No. 117, "*Financial Statements of Not-for-Profit Organizations*". Under SFAS No. 117, the Council is required to report information regarding its financial position and activities according to three classes of net assets: unrestricted net assets; temporarily restricted net assets; and permanently restricted net assets. In addition, the Council is required to present a statement of cash flows. As permitted by this new statement, the Council has discontinued its use of fund accounting and has, accordingly, reclassified its financial statements to present the three classes of net assets required. This reclassification had no effect on the change in net assets for 1994.

Contributions

The Council also elected the early adoption of SFAS No. 116, "*Accounting for Contributions Received and Contributions Made*", in 1994. In accordance with SFAS No. 116, grants and contracts received are recorded as unrestricted, temporarily restricted, or permanently restricted support, depending on the existence and/or nature of any grantor restrictions. As permitted by SFAS No. 116, the Council has recognized the cumulative effect of the provisions of this new statement in its 1994 Statement of Activities. The adjustment of $742,131 made to net assets as of June 30, 1994, represents time-restricted grants and contracts previously reported as deferred revenue. Under SFAS No. 116, such grants and contracts are required to be reported as temporarily restricted support and are then reclassified to unrestricted net assets upon expiration of the restriction. Assuming this new statement had been applied retroactively, the Council's change in net assets for 1994 would have been $ 18,461, $742,131 less than reported.

C. Restrictions On Assets

Temporarily restricted net assets include $991,513 that is available for human resources development and $300,000 that is available for unrestricted general support.

D. Income Taxes

The Council, a private operating foundation, is exempt from federal income tax under Section 501(c)(3) of the Internal Revenue Code and applicable regulations of the District of Columbia.

E. Net Assets Released From Restrictions

Net assets were released from grantor restrictions by incurring expenses satisfying the restricted purposes or by occurrence of other events specified by grantors. The following is a summary of net assets released from grantor restrictions in 1994.

Purpose restrictions accomplished:

Human resources	$ 10,775
Access and processing	2,409
Economics	133,037
	146,221
Time restrictions expired	300,000
Total restrictions released	$446,221

F. Retirement Plan

Employees are eligible for participation in the Council's defined contribution retirement annuity program ("the Plan") administered through the TIAA/CREF insurance companies. Individual contracts issued under the Plan provide for full and immediate vesting of the Council's contributions. The Council contributes 15% of employees' salaries to the Plan each year. The Council's contribution was $50,599 in fiscal year 1994.

G. Concentrations Of Credit Risk

Financial instruments which potentially subject the Council to concentrations of credit risk consist primarily of cash equivalents and grants receivable.

At June 30, 1994, approximately $126,708 in cash equivalents was being held by a third party in a money market mutual fund that invests solely in United States government securities. This amount is not insured by the Federal Deposit Insurance Corporation.

Substantially all grants receivable are with large foundations. It is not the Council's policy to require collateral for these receivables. Generally, the Council has not incurred any losses in relation to these receivables.

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Council on Library Resources, Inc.
SUPPLEMENTARY INFORMATION

STATEMENT OF FUNCTIONAL EXPENSES

FOR THE YEAR ENDED JUNE 30, 1994

	PROGRAM SERVICES		
	Human Resources	Access and Processing	Economics
UNRESTRICTED:			
Grants and contracts	$ 22,600	$ 34,749	$100,752
Refunds and over appropriations	(1,353)	(11,140)	(218)
Staff and travel	39,512	28,697	31,734
Advisory committees, consultants and interns	3,861	6,583	8,955
Board expenses	-	-	-
Support services, including office expenses	36,271	38,992	33,913
	$100,891	$ 97,881	$175,136

SEE NOTES TO FINANCIAL STATEMENTS

Infrastructure	Total Program Services Expenses	DEVELOPMENT	ADMINISTRATION	TOTAL
$ 65,368	$223,469	$ -	$ -	$ 223,469
(765)	(13,476)	-	-	(13,476)
116,717	216,660	79,673	162,385	458,718
53,591	72,990	27,472	19,898	120,360
-	-	-	35,591	35,591
39,881	149,057	6,514	33,760	189,331
$274,792	$648,700	$113,659	$251,634	$1,013,993

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Council on Library Resources
1400 16th Street, N.W., Suite 510
Washington, D.C. 20036
(202) 483-7474